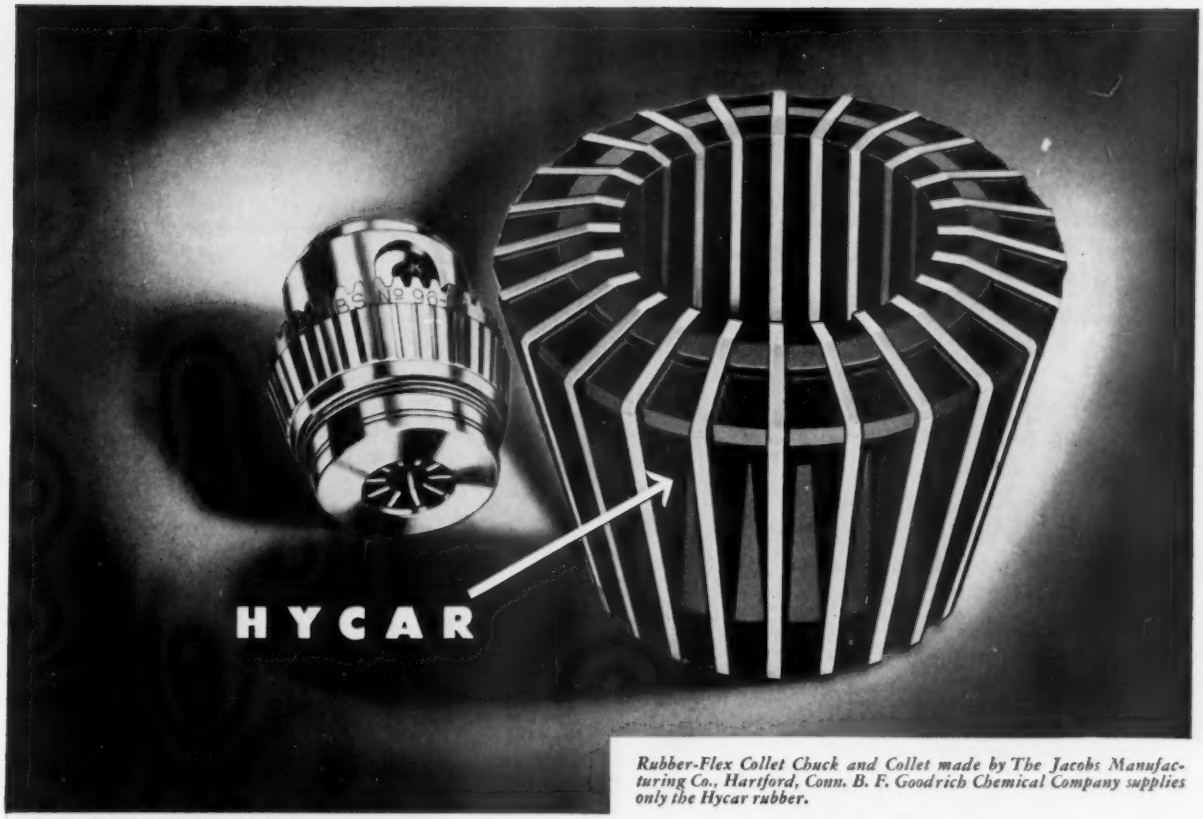
Another new development using

B. F. Goodrich Chemical *raw materials*



Rubber-Flex Collet Chuck and Collet made by The Jacobs Manufacturing Co., Hartford, Conn. B. F. Goodrich Chemical Company supplies only the Hycar rubber.

Left: Jacobs Model 96-05 Rubber-Flex Collet Chuck
Right: Jacobs Rubber-Flex Collet

Rubber-Flex Collet grips steel or glass

11 COLLETS GIVE 88 DIFFERENT SIZE GRIPS

WHEN the Jacobs people, who know their chucks, got together with the Hycar people, who know their rubber, they came up with the new Rubber-Flex collet chuck and the tightest, most accurate grip ever devised.

The chuck's Rubber-Flex collets, made with Hycar American rubber, have a capacity range eight times that of ordinary split steel collets. They come to grips equally well with either tools or work, solid stock or thin-wall tubing, compressible or brittle materials . . . even glass and ceramics.

Hycar rubber is a basic factor in the success of the collet chuck on a whole new range of applications . . . on grinders, jig borers, reamers, and other high precision machines. The Hycar locks the collet's steel jaws mechanically together, insuring an absolutely parallel grip over the entire bearing surface, and actually *tightening* the grip when torque is applied. And vitally important, Hycar effectively resists the deteriorating action of lubes and coolants, withstands shocks and flexing.

Versatile Hycar is used in many industries. It has exceptional resistance to abrasion, oil, gas, heat, cold and many chemicals. Any one or combination of Hycar's qualities may be just what you need to improve a product part or solve a tough product problem. For complete technical service and information on uses for Hycar, please write Dept. CJ-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U.S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

Act of March 3, 1879. Subscription in United States, $5.00 a year; Canada, $5.50; Foreign, $6.00. February, 1955. Vol. 76, No. 5

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This wealth of knowledge, this practical experience, is available to all Philblack customers. Our technical staff may already have solved the problem that is bothering you right now. Consult our Philblack representative or write for more information concerning the versatile Philblacks.

*A TRADEMARK

Know the Philblacks! KNOW WHAT THEY'LL DO FOR YOU!

A **Philblack A FEF Fast Extrusion Furnace Black**
Ideal for smooth tubing, accurate molding, satiny finish. Mixes easily. High, hot tensile. Disperses heat. Non-staining.

I **Philblack I ISAF Intermediate Super Abrasion Furnace Black**
Superior abrasion resistance at moderate cost. Very high resistance to cuts and cracks. More tread miles at high speeds.

O **Philblack O HAF High Abrasion Furnace Black**
For long, durable life. Good electrical conductivity. Excellent flex. Fine dispersion.

E **Philblack E SAF Super Abrasion Furnace Black**
Toughest black on the market. Extreme abrasion resistance. Withstands aging, cracking, cutting and chipping.

Phillips 66

PHILLIPS CHEMICAL COMPANY, Philblack Sales, 318 Water Street, Akron 8, Ohio. Export Sales: 80 Broadway, New York 5, N. Y. West Coast: Harwick Standard Chemical Company, Los Angeles, California. Canada: H. L. Blachford, Ltd., Montreal and Toronto.

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for molding precision parts of PLIOVIC

Heart of a problem for manufacturers of a unique, positive displacement, rotary pump was its elastomeric impeller. In trial units its volume increased some 2%, through absorption of water. High operating pressures plus frictional heat caused further dimensional expansion. As a result, the pump, precision-made to clearances of 0.002" to 0.003", often became inoperative.

In an attempt to free the situation, the all-nitrile-rubber compound was abandoned. New compounds based on polyvinyl chloride resins were tried. After many tests with many resins, it was found that PLIOVIC—the easy processing vinyl—when plasticized with the original rubber, gave the lowest water absorption—0.1% or less. Extensive field trials then proved the PLIOVIC-rubber impeller was extremely smooth-working and virtually indestructible.

Moreover, production workers found that high density PLIOVIC was easier handled, blended more rapidly and thoroughly with the rubber and gave consistently faithful reproduction of the mold. The sum total was a finer product at a cost lower than that possible with other resins.

The particular PLIOVIC used in the impeller compound is one of a family designed to help you to new or improved products, easily and economically. Each of these resins is carefully controlled as to its particle size, shape and distribution to give you maximum ease of processing without sacrifice of desired physical properties. For details, samples and full technical help on which PLIOVIC is best suited to your needs, just write to: Goodyear, Chemical Division, Akron 16, Ohio.

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A GEARLESS PUMP that will move over 600 gallons per hour against pressures up to 150 p.s.i. and a suction lift of 26 feet is made possible with PLIOVIC. A precision-molded, PLIOVIC/nitrile rubber impeller maintains its close tolerances — permits continuous, trouble-free operation. Photo courtesy Eco Engineering Company, Newark, N. J.

Fabric helps Anaconda clear the air— one mile down!

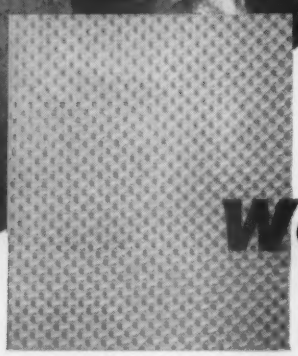
Giant fans expel 300,000 cu. ft. of air per minute from working areas through nylon fabric tubes.

In Anaconda's Butte mine workings—a mile below the earth's surface—temperatures sometimes rise above 100° F. Humidity may be 98%. Dust thickens and clings.

Coated fabric tubes are Anaconda's answer to the ventilation problem, resulting in greater mine safety, more comfortable working conditions. Made of Wellington Sears filament nylon fabric coated with neoprene, these tubes carry dust-laden air to proper exhaust exits.

Their fabric must be flexible—it twists through corridors. It must be strong to withstand abrasion. It must be light (14 oz. a sq. yd.) for easy movement. It must resist the disintegrating forces of heat, humidity, dust, mildew and acids. Wellington Sears is proud that its DuPont nylon fabrics will be installed in all Butte mine workings.

This fabric is only one of many types and constructions offered by Wellington Sears for coating and impregnation. Whether your need is the right fabric for neoprene, vinyl or rubber coating—you'll find your answer at Wellington Sears.



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We are expanding production of HI-SIL 233 continually. Orders now are being filled with a minimum of delay.

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TILTING HEAD PRESS

eliminates mold handling

- Molds fasten to platen.
- Jaws open—operator removes work.
- Molds are filled and press closes.
- No heavy lifting or straining.
- No chance for off-center or slippage.
- Equal, uniform pressure.
- Operates off standard hydraulic drive or individual pumps.
- Can be equipped for Transfer Molding.
- All standard platen sizes with tonnage capacities up to 1,000 tons.

This battery of Tilting Head Presses has been operating many years at Davidson Rubber Co., Charleston, Mass.

National Erie products for the Plastic and Rubber Industries • Extruders • Simplex Doors for Autoclaves • Mills and Hydraulic Presses.

This old and well-known line of machinery was acquired March 1, 1952, by The Aetna-Standard Engineering Company. They are manufactured in their Warren, Ohio, and Ellwood City, Pa., plants. The sales and engineering of the National Erie line is the responsibility of Hale and Kullgren, Inc., Akron, O.

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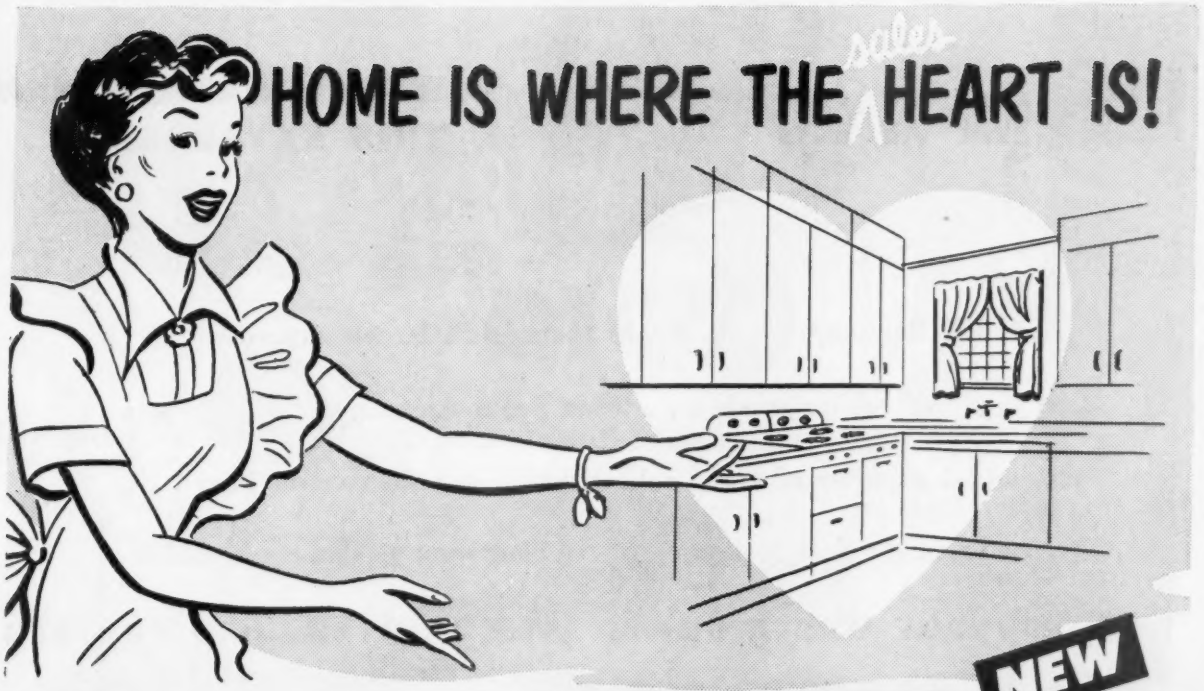

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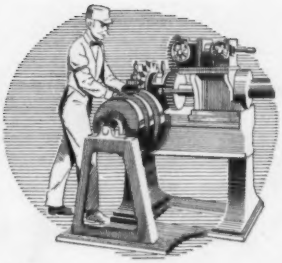
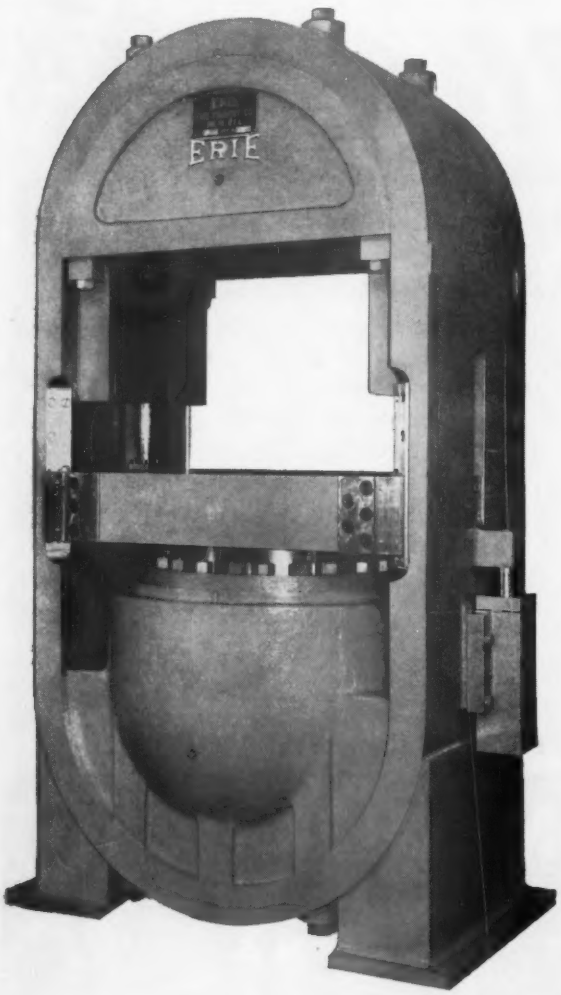


WHEN GRANDPA RAN THIS EXTRUDER

WHEN Germany was the world's largest exporter of rubber goods . . . when South America was the largest exporter of crude rubber which was then called Para . . . . . when the first Malaya plantation yielded crude rubber

ERIE FOUNDRY WAS A GREAT NAME IN HYDRAULIC PRESSES



in today's rubber shop

...when low stress insures minimum deflection

...when high pressures evenly applied to practically deflection-free (within .002 inches) platens guarantee thin flash lines

...when competitive bidding demands maximum service for minimum cost

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is by far the greatest name in special precision hydraulic presses

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Investigate All The Advantages of Plastoleins®

DOZ DIOZ

The Most Versatile LOW-TEMPERATURE *Plasticizers Available*

- ***Unmatched Low-Temperature Flexibility***
- ***Unusually Low Volatility***
- ***Low Water Extraction***
- ***Excellent Heat & Light Stability***
- ***High Plasticizing Efficiency***
- ***Extremely Low Soapy-Water Extraction***

Plastoleins 9058 DOZ (di-2-ethylhexyl azelate) and 9057 DIOZ (di-iso-octyl azelate) possess all the properties of a basic plasticizer and...in addition, offer all the advantages of low-temperature flexibility.

This balanced combination of important properties has led to its extensive use in all types of vinyl compounds including calendered and cast films, calendered sheeting, calendered and dispersion coated fabrics, and all types of extruded products.

Why not give your product better performance and extra sales-appeal by using DOZ or DIOZ. Write to Dept. U-2 today for descriptive literature and samples of Plastolein 9058 DOZ (di-2-ethylhexyl azelate) or Plastolein 9057 DIOZ (di-iso-octyl azelate).

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Plastolein Plasticizers
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for faster, easier dispersion

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. . . now with Better Than Ever dispersion properties

Always easy to disperse, new, improved SOLKA-FLOC now makes possible *even greater* simplification of the critical mixing phase. With this easier, faster dispersion there's less need than ever for costly, time-consuming master batching and refining.

This important development makes SOLKA-FLOC more effective in every way! Now *to a greater degree,* products processed with SOLKA-FLOC can have controlled shrinkage, reduced blistering, sharper designs, harder and smoother surfaces, reduced nerve.

Whatever the product—tiling, soling, matting, molded or extruded goods—new, improved SOLKA-FLOC could mean a better, more salable product . . . bigger profits . . . lower costs! Find out what this versatile material can do for *your* processing. Write Technical Service, Dept FG-2, at Boston for information and samples.

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CHEMICALS

Miles by the millions to make CABOT reinforcing blacks better!

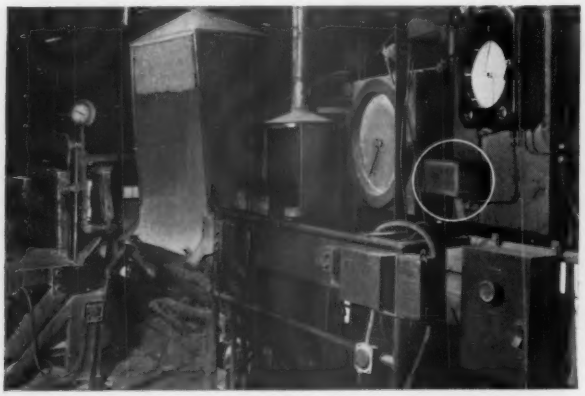
In the laboratory, in the tire factory, and ON THE ROAD . . . Cabot blacks are put through their paces . . . in the Cabot testing program, just as in your testing program. The object? . . . to enable Cabot to produce the best quality carbon blacks . . . blacks that will give longer wear and trouble-free performance.

That's why Cabot's numerous experimental blacks are tested on the road before a new black is submitted to you for evaluation. And that's why Cabot is constantly testing its established range of blacks in all types of rubber. The complete testing of all Cabot blacks every step of the way from development through commercial production is your guarantee of highest quality performance. GODFREY L. CABOT, INC.
77 Franklin St., Boston 10, Mass.

CABOT

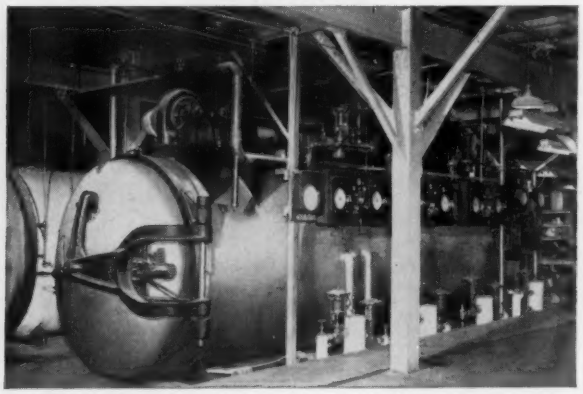
Who controls the RUBBER INDUSTRY ?

WHEN it comes to control of the various processes involved in the production of the finished article, Taylor instruments play an important role. From the accurate measurement and control of the mix in a Banbury, to the fully automatic control of modern tire presses, there are Taylor systems designed to save you money; help maintain product quality. Call your Taylor Field Engineer. Or write Taylor Instrument Companies, Rochester, N. Y.; Toronto, Canada.



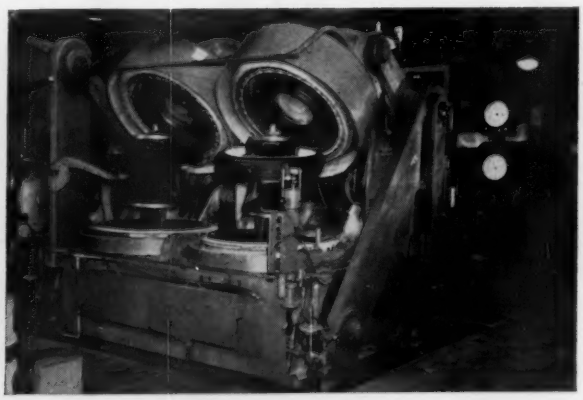
On this Banbury mixer the rugged yet highly responsive measuring system of the TRANSAIRE* Temperature Transmitter (circled) compensates for the poor heat transfer of the mix. The FULSCOPE* Controller accurately records and controls the time and temperature of each batch. Cuts out heat deterioration worries—and risk of fire.

*Reg. U.S. Pat. Off.



A Taylor control system masterminds the operation of these boot and shoe vulcanizers. Steam temperature to the heating coils and air pressure inside the vulcanizers are both controlled, while the system automatically times the cycle, shuts off the air and vents the vulcanizer.

Taylor controls the entire operation of these multi-platen presses, from closing to opening. In addition, steam pressures are automatically regulated and recorded, condensate temperature is recorded—and condensate is disposed of at adjustable repeating intervals.



The sequence and duration of all the functions of this Bag-O-Matic Press are automatically controlled by Taylor instrumentation, from closing to opening of the press. This includes control of press temperature and condensate removal in each cavity, and the recording of bag pressure to each press.

Taylor Instruments MEAN ACCURACY FIRST

Lithols... Red Lake Cs...
Bonadur Reds... Naphthols... Cadmiums...
Cyanamid's Pigments Division
Offers a Red Pigment
for Every Rubber Application
Whatever your requirements in red pigments, one of these efficient Cyanamid pigments can meet them:
LITHOLS and RED LAKE Cs . . . for low-cost color strength, brilliance, good working properties.
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NAPHTHOLS... for high color strength and brilliance, with outstanding resistance to acids, alkalis, soaps and chemical detergents.
CADMIUMS...for maximum stability and permanence.
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a new guide to rubber and plastics
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These machines, which include plasticators, pelletizers, extruders, strainers, strainer-extruders, tubing and straining machines, and special-purpose machines, are all designed and built to suit individual needs. Their various features, as well as materials of construction, are dictated by the use intended for the machine and the particular requirements of the application.

Shown also, are diagrams of production layouts. These setups are developed by the F-B engineering planning division to help you obtain greater processing efficiency, and to reduce handling costs. Extruding machines, matched in capacity with other units so that production proceeds evenly, play an important part in these layouts.

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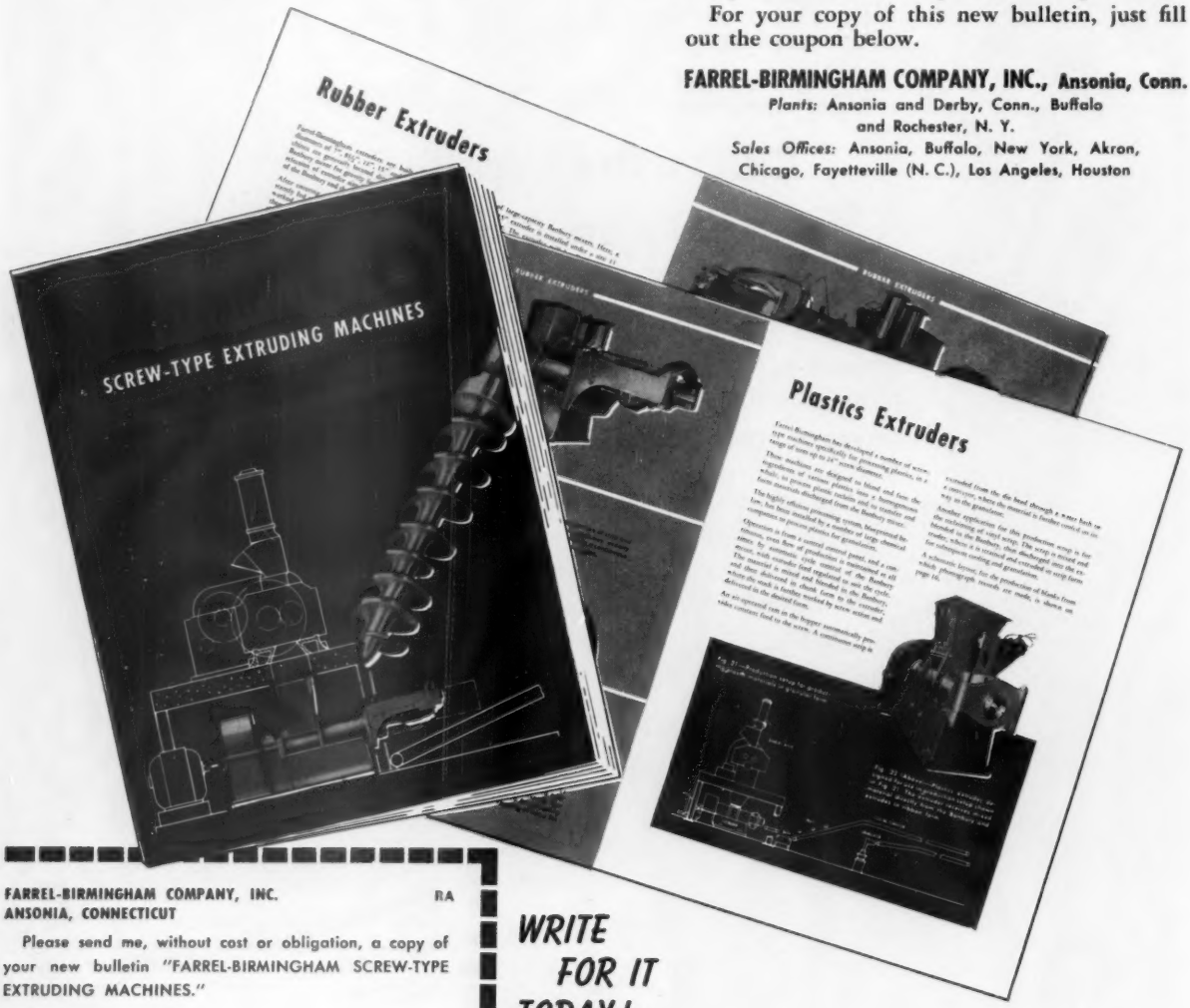

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Dixiedensed blacks are most dependable for uniform quality and satisfactory performance. Obviously, compounders rely upon them for solving cost and quality problems.

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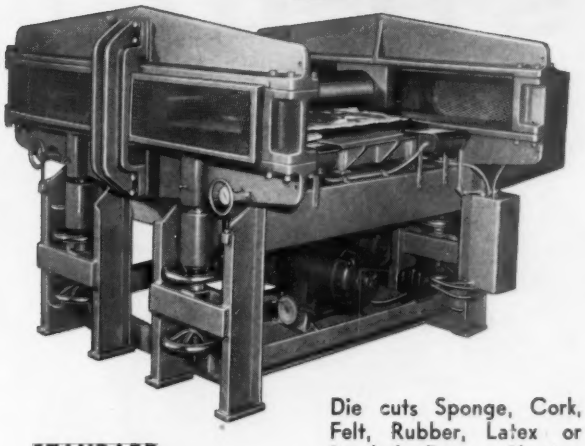
with **Campbell** SPECIAL MACHINES

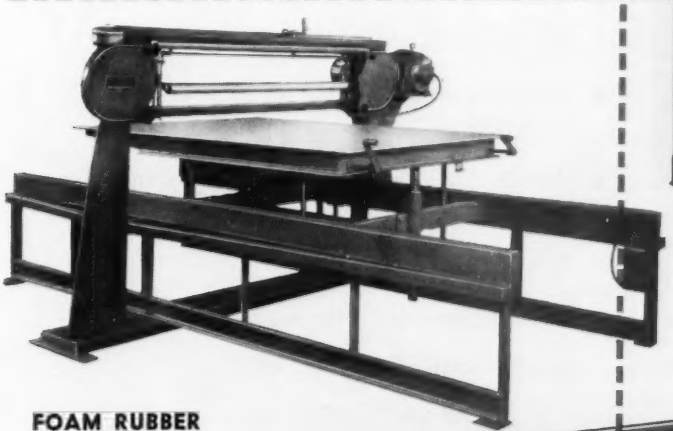


STANDARD AND HEAVY DUTY ROLLER DIE CUTTER
(bed area to 24 sq. ft.)

Die cuts Sponge, Cork, Felt, Rubber, Latex or Bonded Foam, Plastics, etc., *and trims molded rubber.* Standard and Heavy Duty Models.

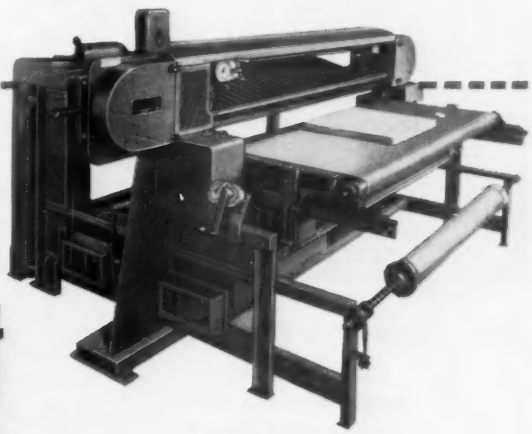
What materials do you want to cut, trim, split or shape? Is it Foam Rubber, synthetic or natural? Is it Plastic? Is it Rubberized Hair, Cork, Cellulose Sponge, Wood Fiber, Latex or Bonded Foam? Campbell Splitters, Die Cutters and Cushion Cutters are setting production records in splitting, die cutting and shaping materials like these and others.

Call or write us for facts and quotations. Send us your particular stock for test cutting without obligation.



FOAM RUBBER CUSHION CUTTER

The Cushion Cutter is ideal for fabricating cushioning and seating materials, also for leveling materials including plastics before splitting.



FOAM RUBBER SPLITTER

Engineered especially to split synthetics, natural foam rubber, plastics, etc. Splits rolls, slabs, sheets to 1/8" thickness, at 9 to 26 feet per minute.

These machines will die cut or split Synthetic and Natural Foam Rubber, Latex and Bonded Foam, Rubberized Hair, Cellulose Sponge, Cork, Resin Bonded Fiber, Wood Fiber, Fiberglass and similar stock in rolls, slabs and sheets.

The FALLS ENGINEERING AND MACHINE CO.

Established 1917

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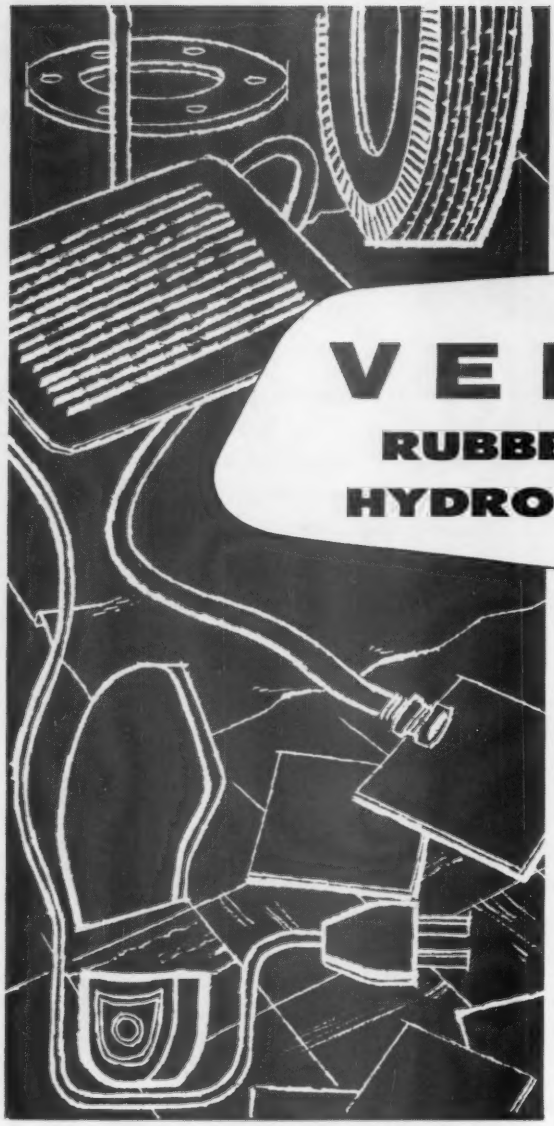

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VELSICOL

RUBBER PROCESSING HYDROCARBON RESINS

Available in Varied Melting Point Ranges

- Compatible with natural and synthetic rubbers.
- Effective plasticizers and softeners.
- Improve milling, calendering and tubing characteristics.
- Provide excellent physical properties.
- Ideal dispersing agents for fillers and pigments.
- Possess high electrical resistance properties.

Some Suggested Applications

MECHANICAL GOODS
RUBBER SOLES AND HEELS
RUBBER FLOOR TILING
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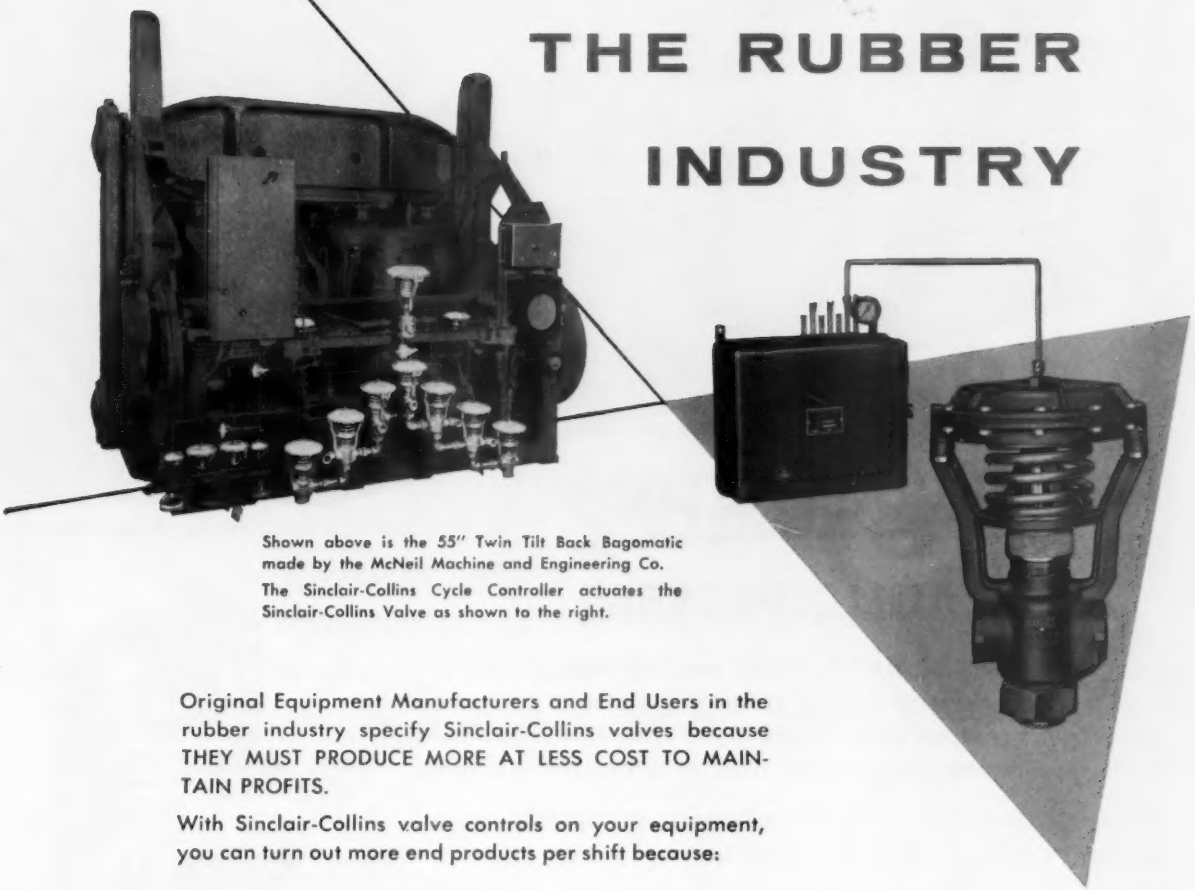

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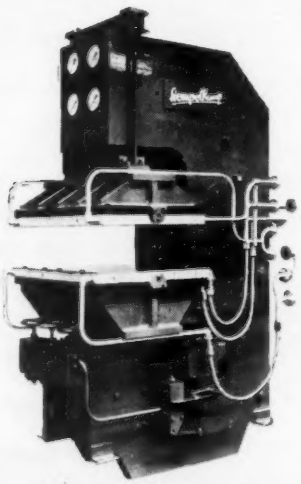

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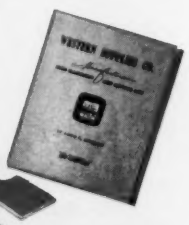

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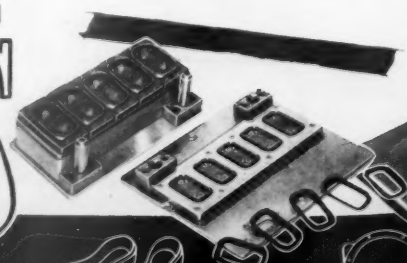

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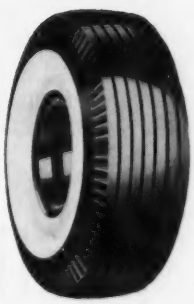

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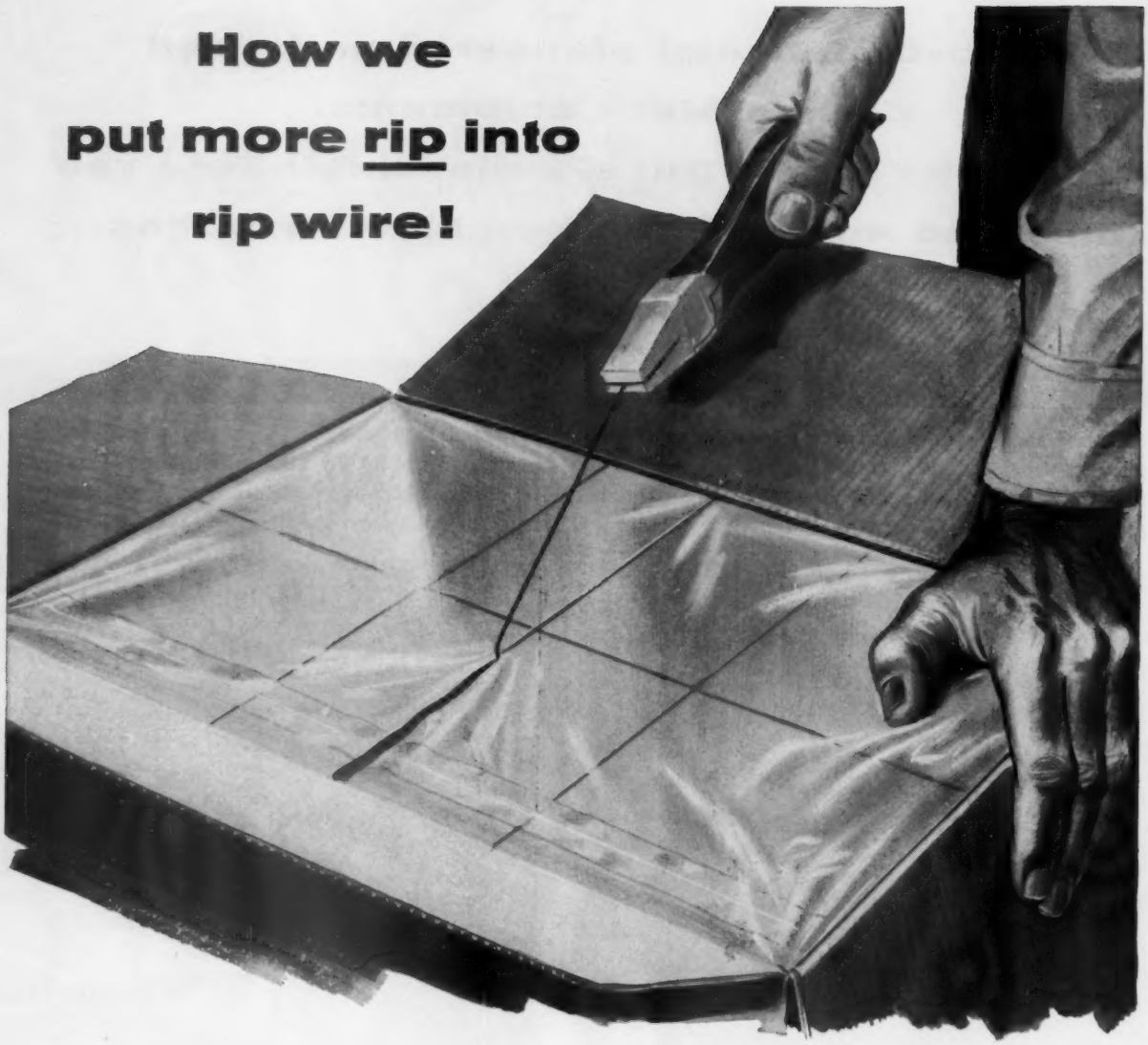

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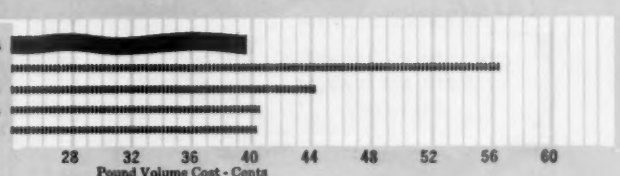
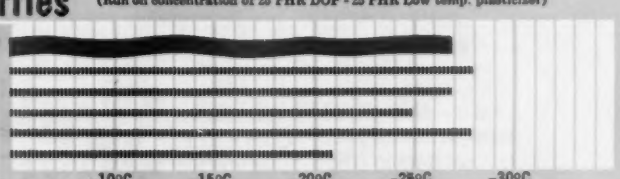


volatility

low temperature properties



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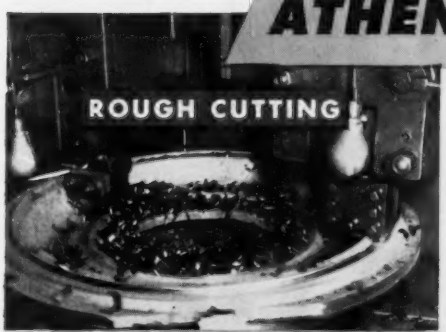

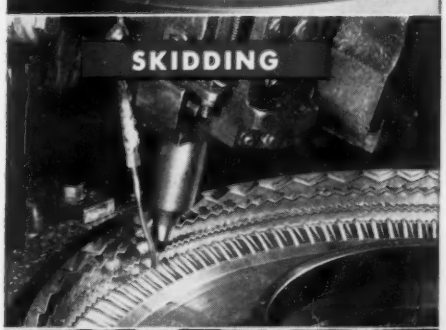

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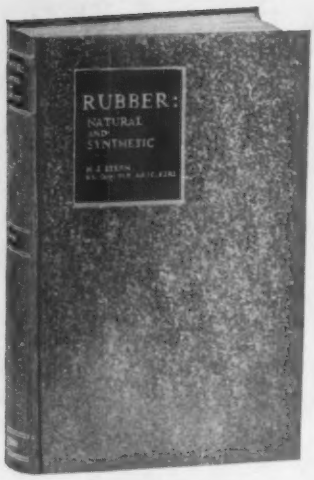

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By H. J. STERN

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About the Author—

Dr. Stern has been engaged as a chemist in the rubber industry for more than 25 years and since 1935 has practiced successfully in London as a Consultant. He is the author of "Practical Latex Work" and of many publications concerned with the scientific and technological aspects of natural and synthetic rubber.

SUMMARY OF CONTENTS BY CHAPTERS

Part I

1. **Historical Introduction; Mastication; Vulcanization.**
2. **Plantation Rubber.**
3. **Natural Rubber: Composition, Reactions, Derivatives.**
4. **Properties of Vulcanized Rubber.**
5. **Compounding Ingredients.**
6. **Rubber Machinery; Solvents and Solutions; Reclaiming.**
7. **Latex.**

Part II

8. **Synthetic Rubber (History and Development).**
9. **Manufacture and Technology of Synthetic Rubbers.**
10. **Synthetic Rubber Latices.**
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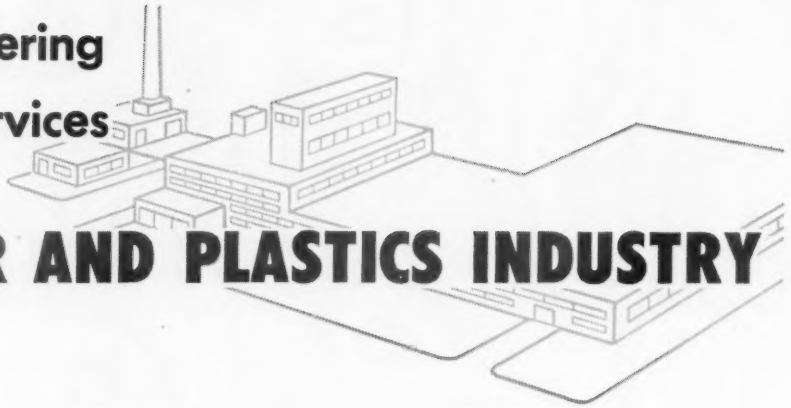

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ORGANIC 7-V-1: Epoxy assistant.
ORGANIC 7-V-2: Epoxy assistant.
ORGANIC 7-V-4: Epoxy assistant, for rigids.
BARIUM 1-V-3: Dispersible stearate, to contribute lubricity with barium effects.
BARIUM 1-V-6: For asbestos filled tile.
BARIUM 1-V-7: Liquid, for modified plastisols and organosols.
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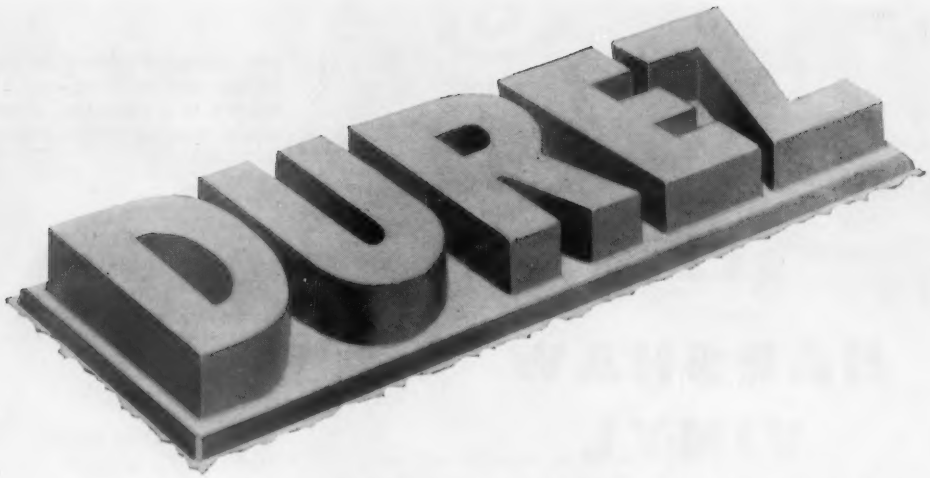

...wherever there's a reason for RESIN

IN HARD AND SEMI-HARD STOCKS

Special Durez phenolic resins are completely compatible with nitrile rubbers. Chemical reactivity causes vulcanization with greatly increased strength, hardness, stiffness, abrasion resistance, heat and chemical resistance.

Our Durez resins have a plasticizing effect during processing. When set, they contribute to hardness, stiffness, and wear resistance in GRS stocks, and in blends of GRS and natural, straight natural, and Neoprene.

IN SOLVENT-TYPE ADHESIVES

Resins are used with nitrile rubber, natural rubber, or Neoprene to produce adhesives that form strong bonds which increase in strength on aging. Another interesting use of Durez resins: as an adhesive for bonding cured and uncured nitrile rubber stock to various metals during the bonding operation.

IN SYNTHETIC RUBBER LATICES

Water-emulsifiable resins are used for reinforcing and hardening latex films. These benefits are conferred on nitrile films in outstanding degree. There is a Durez special resin also for use with high-styrene-butadiene latex.

YOURS FOR THE ASKING—we'll gladly furnish technical data and help you select the phenolic resin best suited to your needs. As a starter, let us send you our newest bulletin on Phenolic Resins in Rubber.

DUREZ PLASTICS & CHEMICALS, INC.

102 Walck Road, North Tonawada, N. Y.

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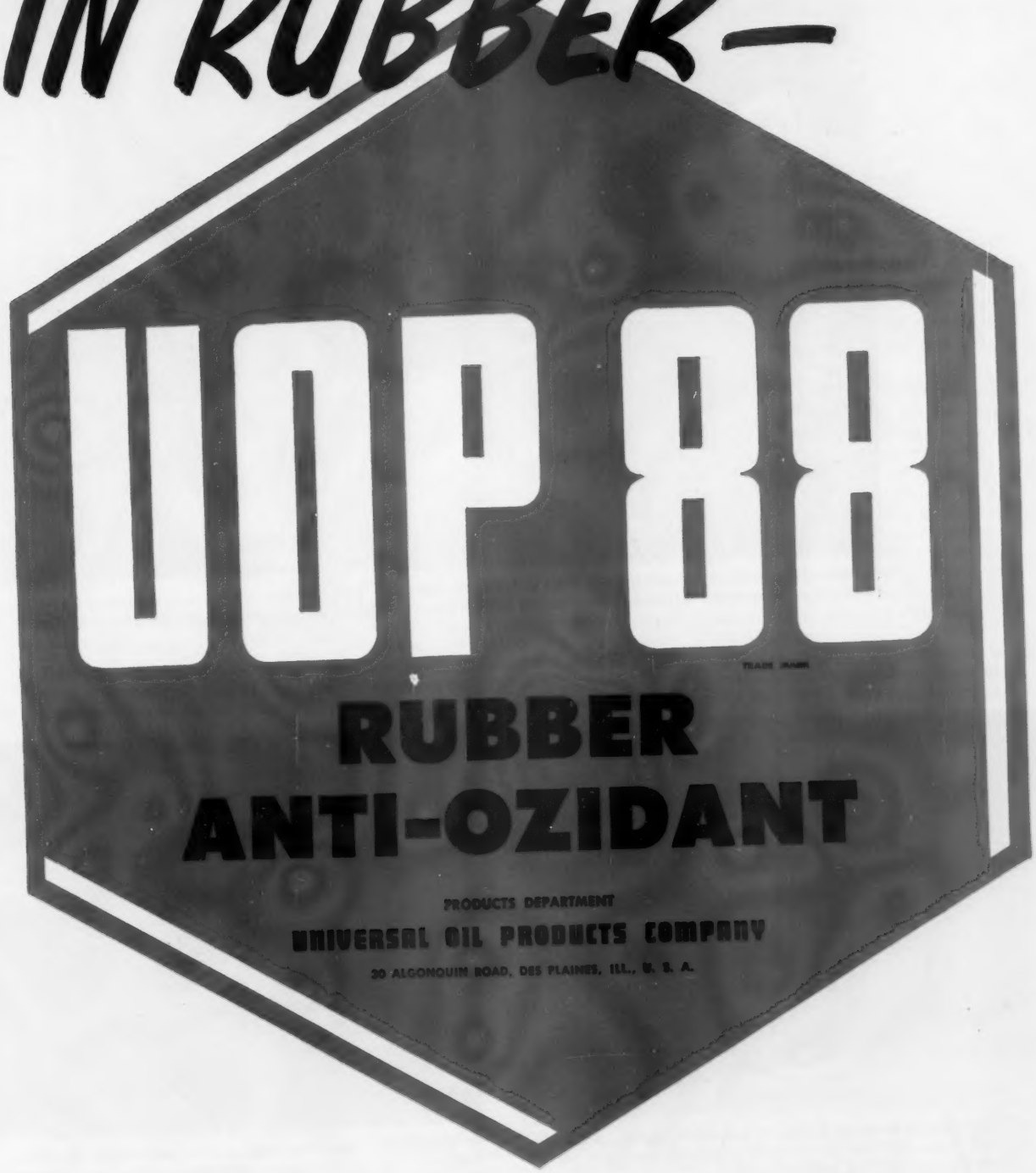
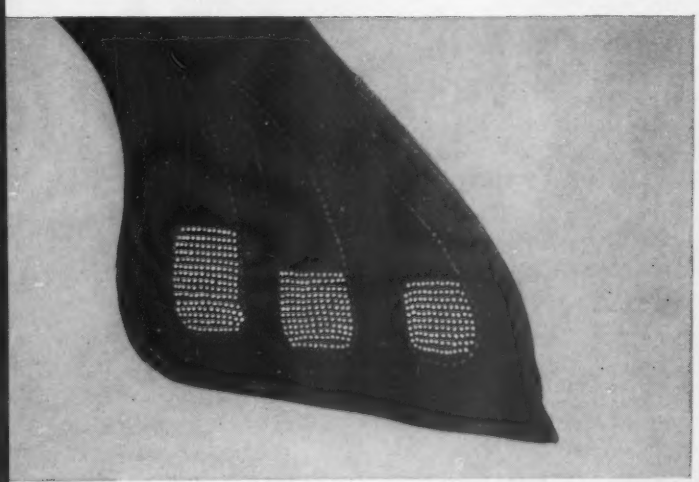
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

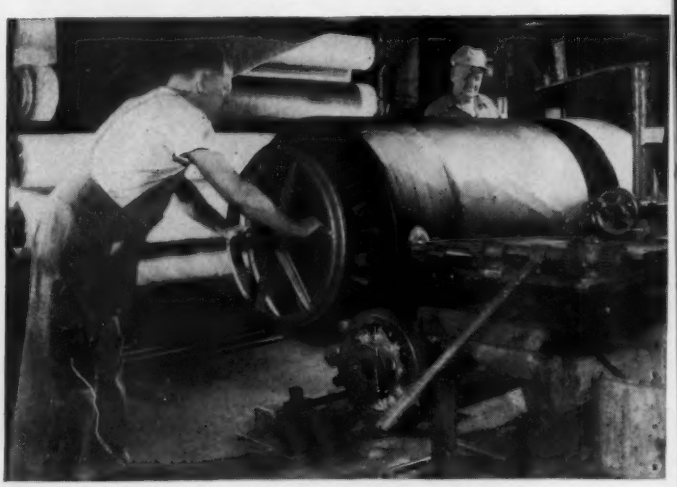
STOP CRACKING IN RUBBER—



1. Steel Wire feeds smoothly into a bead building machine. The parallel wires are insulated with rubber to avoid wear between the wires, then wound into layers that build up into an engineered tire bead design.



2. Tire Beads for tires on heavy earth moving equipment are like those on your automobile, although they contain more wires for carrying heavier loads.



3. Becoming an Integral Part, the beads are first wrapped into a unit and positioned in the tire carcass, then built into the structure of the tire.

4. Samples Are Tested to make certain wire meets requirements for tire beads. Here the bronze coated wires are being tested under tension for proper adherence to rubber.

5. One of World's Largest Tires, made by Firestone for U. S. Army "Barc," is 9½′ in dia., weighs 2,952 lbs. Tire is built to carry 60,000 lbs.

The Secret Strength of Tires

When they talk about "beads" in the tire industry, they don't mean ladies' jewelry. They're talking about the tough steel wires that anchor a tire to its rim.

Whether you're driving an automobile, an airplane, giant earth-moving equipment or anything that rolls on pneumatic tires, you are counting on the hidden bead wires to take up the full force of the load in starting, stopping or roaring across country. Tire beads transmit the load from the steel rim of the wheel.

If the cord body of your tire is damaged, you can have it fixed. But if the vital bead wires are broken, they can't be repaired. You have to replace the tire. So you are depending on tire bead wire to perform for you, and tire manufacturers insist on the best to do the job.

• **Design For Strength**—Busily producing thousands of tons of this wire going into tires made by every major tire manufacturer in the country are the experts of Johnson Steel and Wire Company. At Firestone Tire and Rubber Company, for example, their wire is going into some 60 different types of tires rolling off production lines by the millions every year.

It isn't ordinary wire. It is a special high carbon steel wire only 0.037 inch in diameter . . . so small that it takes about 274 feet of it to weigh a pound. Yet a single strand of this wire has a minimum breaking weight of over 285 pounds, equivalent to a tensile strength of approximately 270,000 pounds minimum per square inch. It has special requirements for torsion, elongation and straightness. In addition, it has a clean bronze plate finish so that the rubber in the tire will adhere to it.

Wires feeding into Firestone's bead building machines lie parallel, from three to twelve wires wide, depending on the engineered design of the bead. As they move rapidly through the machines, rubber completely encases them so that there will be no mechanical friction between wires.

Strands of coated wire come out of these machines looking much like a black tape. The tape is wound one turn on top of another until the bead reaches the required depth. Then it is wrapped with various types of fabric until it becomes a unit ready to be built into the structure of the tire.

• **Built To Take It**—The bead for a motor scooter tire is only three wires wide and three turns deep, giving you a bead containing a total of nine wires. Your automobile tire may have a six-by-five wire bead with a total of 30 wires. And, of course, there is one bead on each side of the tire. Air pressure inside the tire assures a snug fit of the bead against the rim.

Airplane tires have beads specially built for shock loading, as the tires must take the load of the plane and accelerate from motionless to rolling speeds of almost 200 miles per hour. These tires have up to three beads on each side, containing a total of nearly 500 wires per side and providing a breaking strength of over 140,000 pounds.

One of the largest tires in the world, built by Firestone for the U. S. Army "Barc," is 9½ feet in diameter. It weighs a ton and a half and its beads contain over 1,200 wires per side, giving a breaking strength of over 340,000 pounds.

• **Let 'Em Roll**—With the advent of the new tubeless tire, the use of tire bead wire and its importance to the tire industry are continuing to develop. Its uniform strength and rigidity offer ease and speed in manufacturing. Its adaptability to the necessary bead shapes through combination of strands gives the tire industry flexibility in design.

That's why you'll find Johnson Steel and Wire's tire bead wire used by Firestone and all the other blue-chip tire manufacturers.

If you use fine wire specialties, why not look into the opportunities Johnson Steel and Wire offers you. Its range includes aircraft cord wire, armature binding wire, wire for brushes, metal stitching, hose reinforcement, stapling wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire right down to sizes as fine as a human hair. Why not call today. You can count on prompt personal service!

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

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a subsidiary of **Pittsburgh Steel Company**

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and

1. Easy to Disperse
2. Low Heat Build-up
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5. Uniform Particle Size

Millical is an excellent filler for extruded items as it prevents sagging and collapsing of the stock in open steam cures. It also improves calendering and molding of highly loaded compounds and is, therefore, recommended in floor tile, cove base, synthetic rubber soles and household goods such as jar rings, sink strainers, etc. In natural rubber heels, MILLICAL imparts good mold flow, fast cure and excellent resilience.

Kalite provides a smooth surface and reduces shrinkage in calendered and extruded compounds; cuts down tackiness in reworking; improves flow of extruded compounds. It is recommended for light or dark colored, highly loaded, soft-rubber compounds, where it gives low modulus, good tensile and tear properties, and high elongation.

For further information on DIAMOND precipitated calcium carbonates, call your nearest DIAMOND Sales Office or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio. *®

PHYSICAL PROPERTIES

	Millical	Kalite
Color	Light Cream	Light Cream
Density-tapped	38-42 lbs. per cu. ft.	60-65 lbs. per cu. ft.
Particle Size	One micron (average)	One micron (average)
Specific Gravity	2.65	2.65
Coating	None	1% Stearic Acid

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For all the others Neville has a complete line of Coumarone-Indene Resins, as well as Petroleum Resins, Reclaiming Oils, Softeners, and Plasticizers.

Speaking of plants, our main one is located in the Industrial East with another in fast-growing Southern California. We are branching out too with warehouses in South Kearny, N.J., Philadelphia, Los Angeles, Montreal, Toronto, and Boston. So, whether you are on the main stem or not, Neville Products are near you.

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NEVILLE

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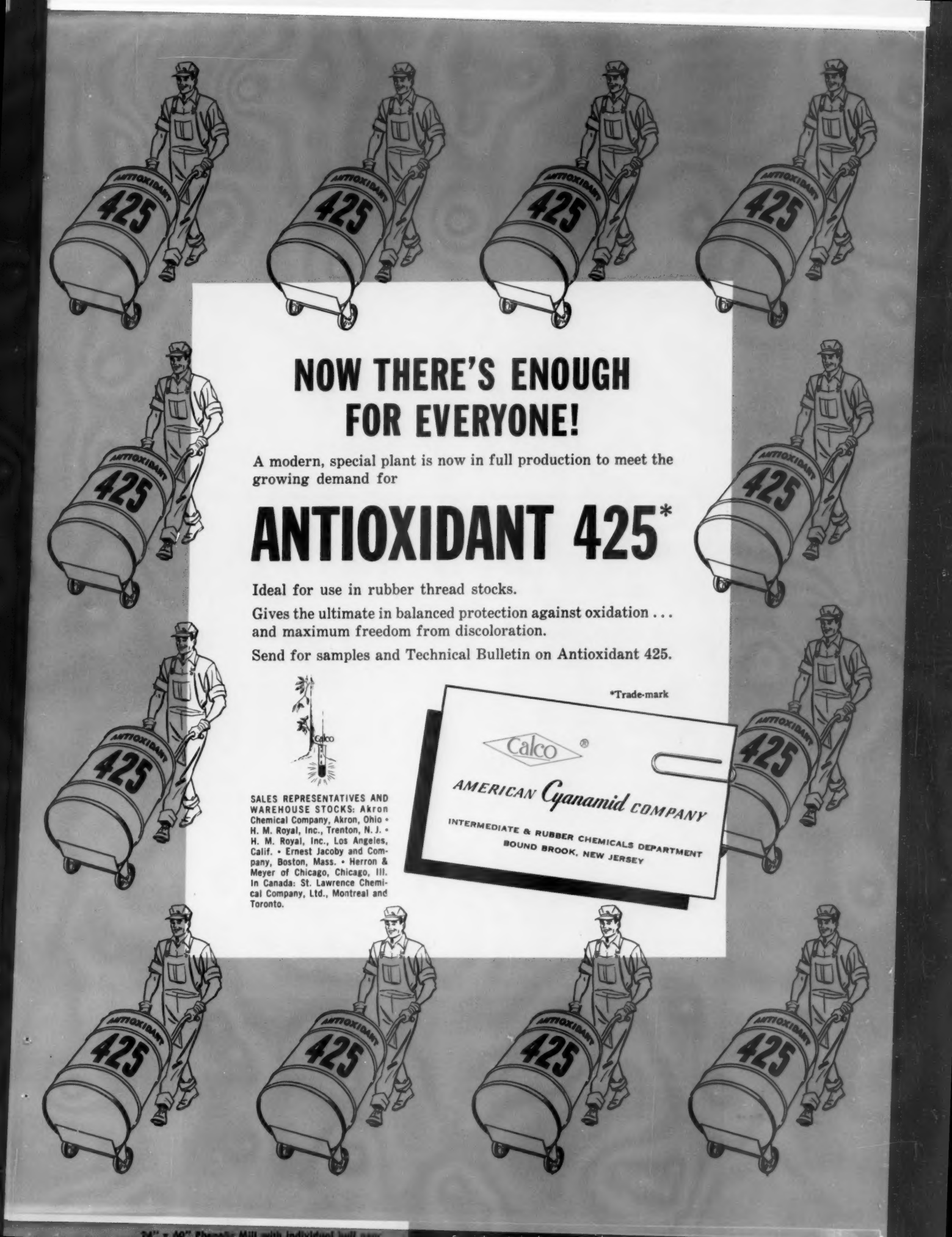

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ANTIOXIDANT 425*

Ideal for use in rubber thread stocks.

Gives the ultimate in balanced protection against oxidation . . . and maximum freedom from discoloration.

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Now! Hot Stretch your Nylon Tire Cord

at

CONSTANT *Temperature*
CONSTANT *Time*
CONSTANT *Tension*
VARIABLE *Line speeds*

IOI's *new* ROLLEVATOR OVEN* *eliminates need of continually balancing 3-T's... enables you to set for optimum results and keep them constant*

THE ROLLEVATOR OVEN is an achievement accomplished by IOI as the result of more than four years of engineering and construction of full width, high tension equipment for dipping and hot stretching nylon fabric. It takes the 3 T's out of the category of variables and makes them constants. No longer must the 3 T's be continually balanced. Now you can hot stretch nylon at *constant* temperature, *constant* time and *constant* tension at *any* line speed.

Fast or slow, start-up or shutdown, the oven temperature is always the same—no more costly cold-air purges for shutdowns—no more elaborate control equipment—no reason for varying the oven temperature. There is but one temperature that is best for stretching nylon fabric and the Rollevator Oven enables you to set for that temperature and forget about it from that point on!

What about time? With temperature constant, hot stretch exposure time can not vary with line speed. The unique design of the Rollevator Oven automatically insures that each and every yard of fabric is hot stretched for the same length of time at the optimum temperature, at any line speed.

Tension, the third vital quality factor, is also held constant in this Industrial Ovens system. More closely so and at higher limits than ever before, because of improved design in the hold back and pull roll stands.

*Trade Mark

*Patent applied for.

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IOI ENGINEERING VERSATILITY

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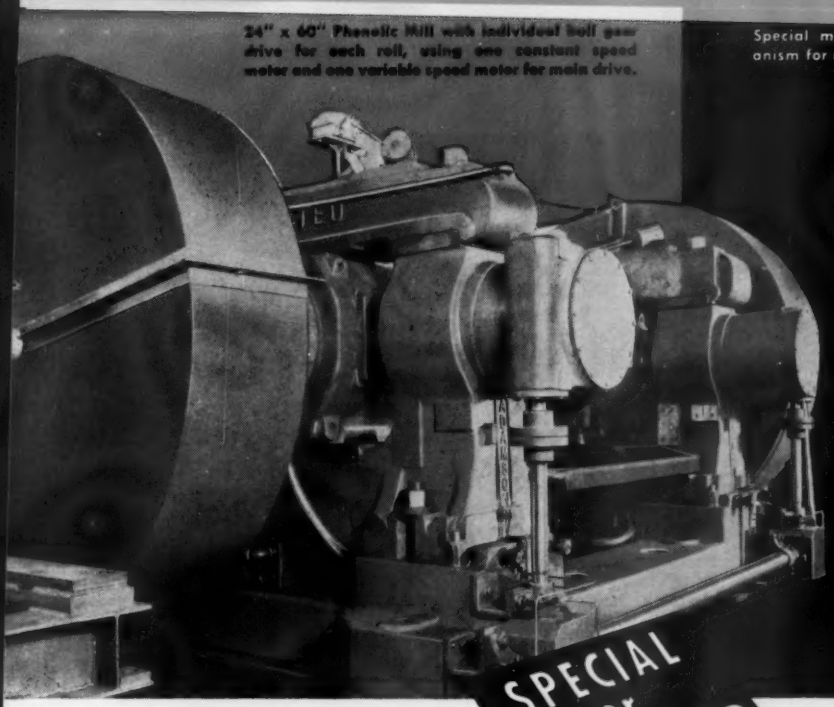
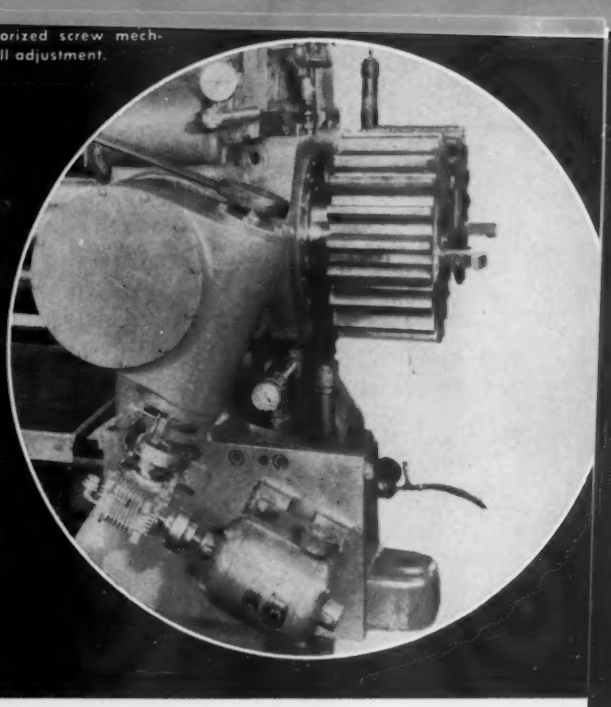


24" x 60" Phenolic Mill with individual ball gear drive for each roll, using one constant speed motor and one variable speed motor for main drive.



Special motorized screw mechanism for roll adjustment.

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ADAMSON UNITED MILLS

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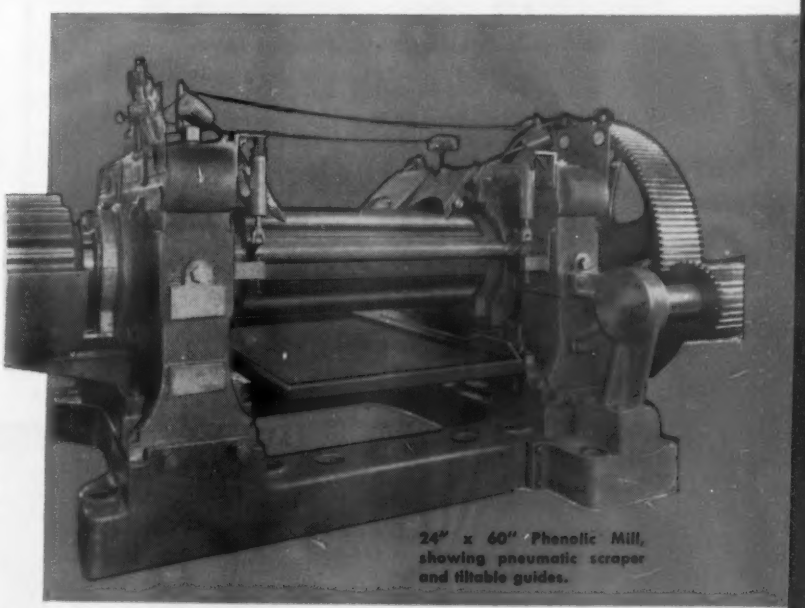
we can design . . .
build and install
the right mill
for your requirements

A STANDARD MILL may be all you need. But often the kind of stock to be processed, temperature, gage and production rate, may require an entirely new type of specially designed mill.

Given the necessary data, our engineers, who are thoroughly familiar with today's rubber and plastics processing problems, will modify an existing type of mill or create a new design to exactly meet your requirements. Because the unusual is *usual* at ADAMSON, numerous concerns, for many years, have been turning over their process problems to us to carry through from blueprint to point of production. Our business has been built on that kind of service.

Why not call us in on your next mill installation? There'll be no obligation on your part.



24" x 60" Phenolic Mill, showing pneumatic scraper and tiltable guides.

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FOR DICING SHEET STOCK

The Famous CUMBERLAND "Stair-Step" Dicer

Here at last is the answer to your problems of dicing rubber or vinyl sheet stock. Produces perfect cubes ranging in size from ⅛ to ½" by merely changing knives.

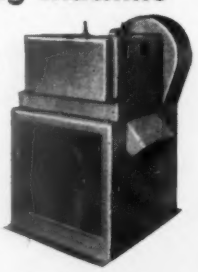
Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

The CUMBERLAND Rotary Chopping and Dicing Machine

As a chopper, this machine efficiently cuts rubber and vinyl slabs into small pieces. Two sizes available to handle stock widths up to 14 or 24 inches.

As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.



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Investigate Cumberland's complete line of granulating machines. Request Bulletin 251

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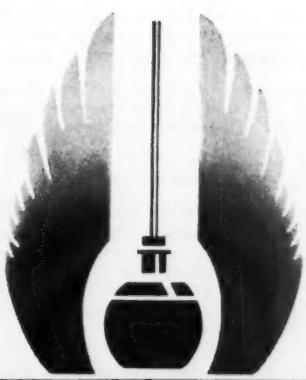

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maintains the flexibility of vinyl film & sheeting

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Draper 3.2 provides low temperature flexibility superior to dioctyl adipate, and, with a lower specific gravity and low volatility, Drapex 3.2 gives you the added advantage of lower volume cost.

And, because of its epoxy content, Drapex 3.2 provides excellent stability, high heat resistance, and good weathering characteristics. In addition, its low soapy water extraction (comparable to dioctyl sebacate) helps you make better, longer lasting vinyls.

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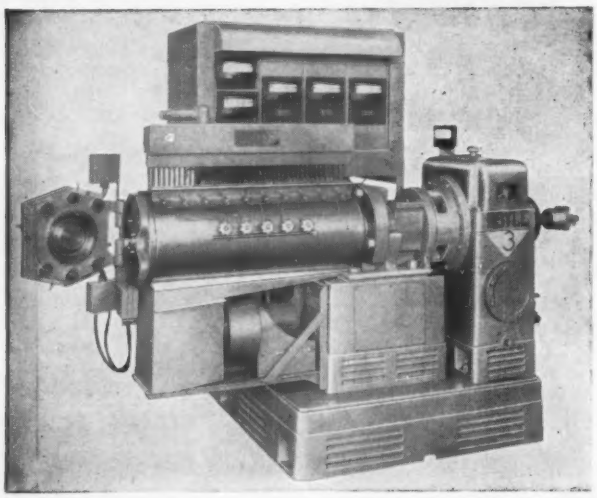

Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
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- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

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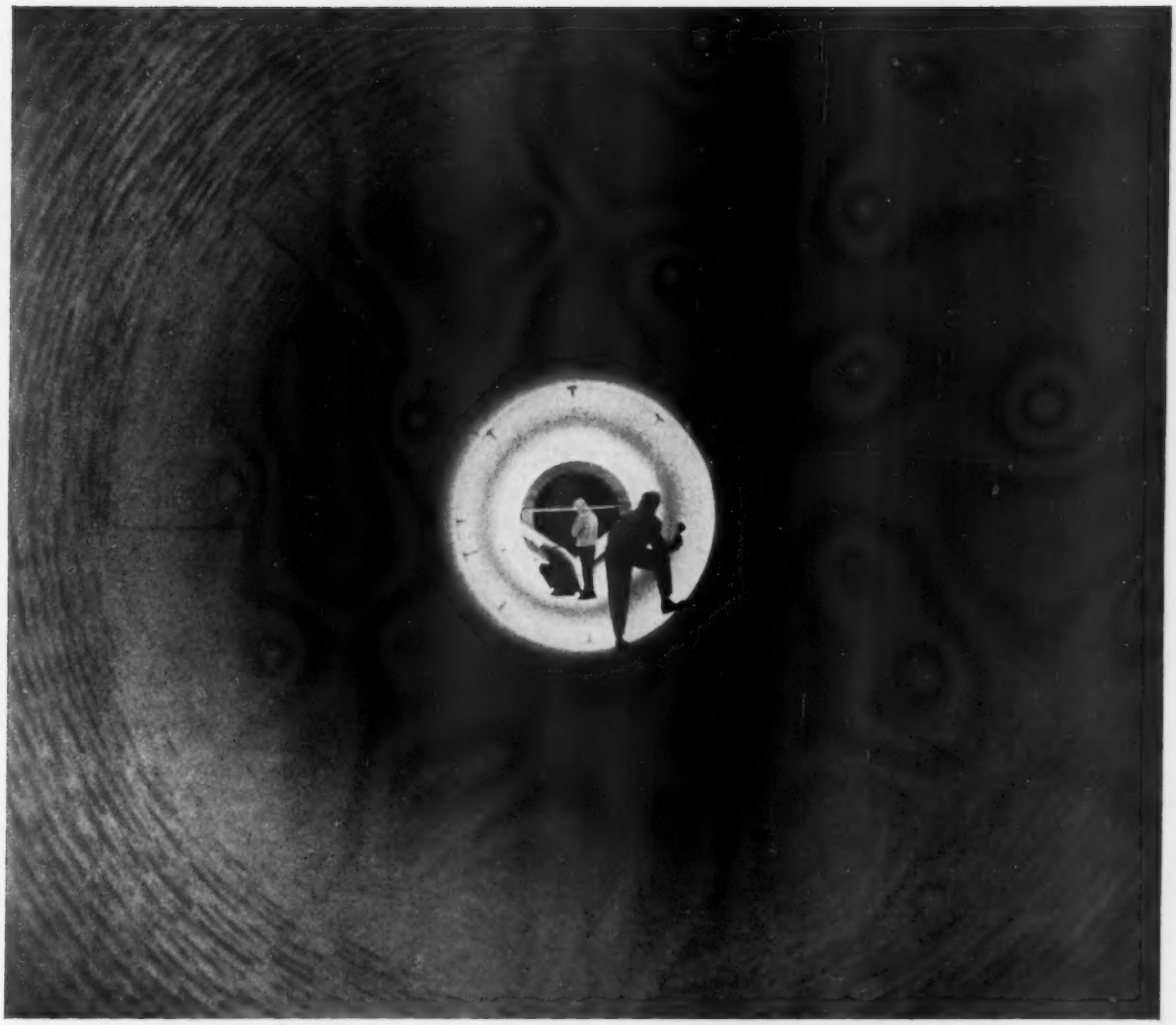

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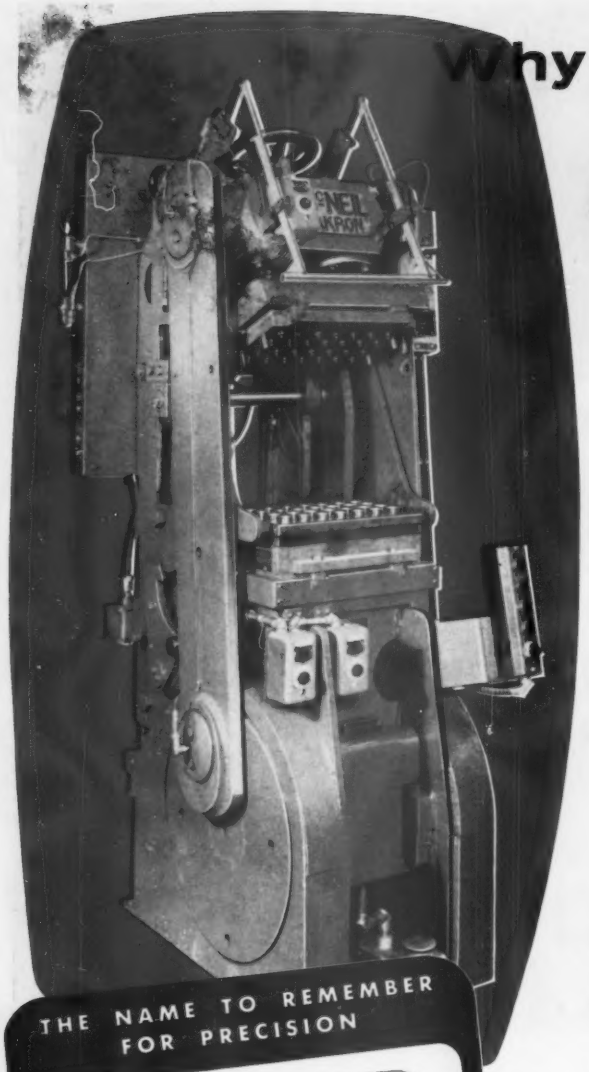
Why the New McNEIL-AKRON "BANTAM"



Speeds Mechanical Goods Production . . . Cuts Mechanical Goods Cost

Enthusiastic owners of the new McNeil-Akron Model 150-10x16 Press — the BANTAM — report it is "really something to crow about!"

As proud parents, may we modestly say this about our new 'baby':

THE BANTAM IS COMPACT — Overall measurements are 26½" x 44" x 5'10" closed or 6'10" open. Requires only 8 sq. ft. of floor space. Perfect for manufacturers not requiring the volume production of our larger presses . . . and for crowded press rooms.

THE BANTAM IS FAST, EFFICIENT — Small though it is, the BANTAM is nevertheless a high production unit. Designed especially for speedy transfer molding of small, intricate and close-tolerance parts, it is in keeping with today's trend toward the use of smaller molds in greater number. Handles 2-, 3- and 4-plate molds automatically. And because everything is handled mechanically, hand work is eliminated and mold maintenance costs are slashed!

THE BANTAM IS DEPENDABLE — Built to McNeil PRECISION standards, it is maintenance-free as only a McNeil can be.

THE BANTAM IS VERSATILE — It can do a lot of jobs within the limits of its maximums of 1000-lb. per sq. in. platen pressure and of 400° F. temperature in its electrically heated platens. What's more, it has an automatic, adjustable knockout mechanism that provides new latitude to mold design.

THE BANTAM IS A MONEY-MAKER — Low in original cost, it is economical to buy, to own and operate. It will quickly pay for itself in profitable production.

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THE McNEIL MACHINE & ENGINEERING CO.

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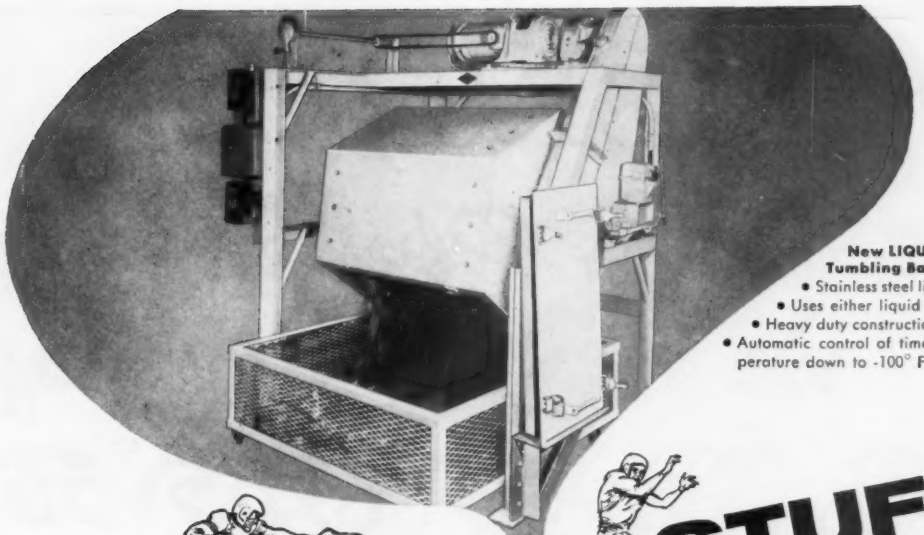

New LIQUIMATIC Rubber Tumbling Barrel

- Stainless steel lining, 3" Rubatex insulation.
- Uses either liquid CO_2 or Dry Ice.
- Heavy duty construction throughout.
- Automatic control of time and temperature down to -100° F.

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Want smooth, flashing-free rubber products? Want them in less time, at lower cost? Then you need the new LIQUIMATIC CO_2 Rubber Tumbling Barrel. Wholly new in design and operation—it's the most efficient machine of its kind ever made. Engineered and manufactured by The LIQUID CARBONIC Corporation—world's largest producer of CO_2.

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For any CO_2 application

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RED DIAMOND CO_2 . . .
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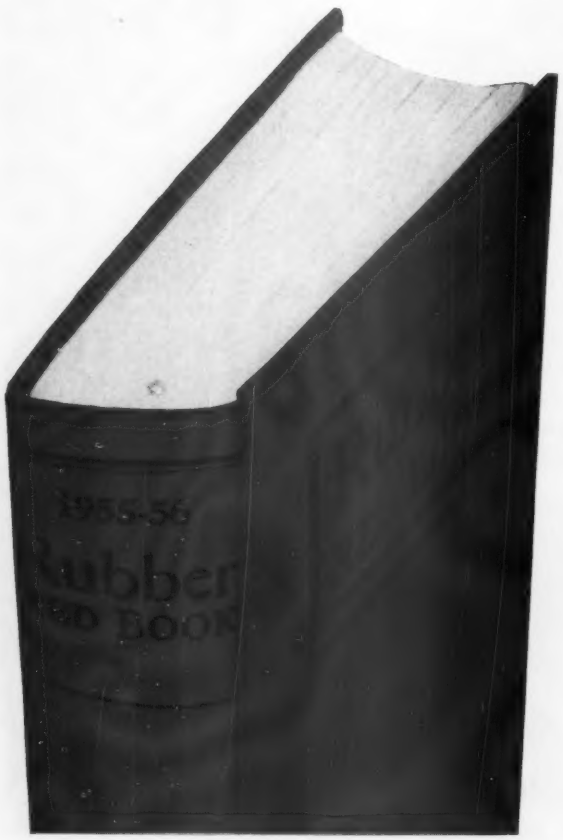

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CONTENTS FOR FEBRUARY, 1955

The Use of GR-S, Sodium Rubber and Neoprene in Truck Tires—*By W. W. Rinne, I. J. Sjothun and P. S. Greer* .. 709

Nitrile Latices as Warp Sizes for Blue Denim Yarn 714

Vinyl Stabilizers and Calender Roll Build-Up—*By F. R. Hansen and S. F. Dennis* 715

New Type Rubber Grommet Solves Design and Engineering Problems 718

Statistical Design in Compounding Elastomers—*By W. L. Gore* 719

The Butyl Story: A Panel Discussion Held by the Chicago Rubber Group 721

Wire Thread Inserts Eliminate Repairs in Tire Molds 726

How Industrial Trucks Solve Handling Problems at General Tire's Factory in Akron 727

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REGULAR DEPARTMENTS

Book Reviews	772	Los Angeles News	758
Canadian News	760	Names in the News	755
Chemical Prices	780	New Equipment	768
Classified Ads	794	New Goods	764
Coming Events	747	Obituaries	762
Editorials	729	Rubber, Cotton Markets..	776
Financial News	756	Statistics	*

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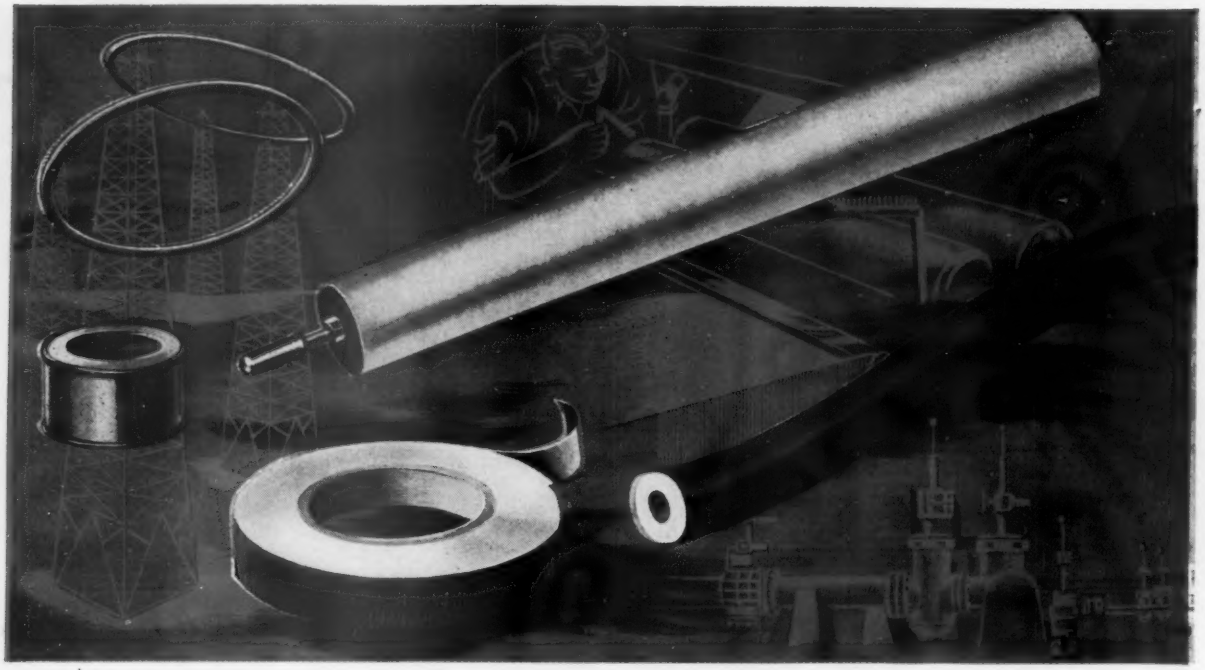

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RUBBER AGE

Vol. 76, No. 5 FEBRUARY, 1955

The Use of GR-S, Sodium Rubber and Neoprene in Truck Tires

By W. W. RINNE, I. J. SJOTHUN* and P. S. GREER

Office of Synthetic Rubber, Federal Facilities Corp., Washington, D. C.

SYNTHETIC rubber as produced today is adequate for performance in passenger car and farm service tires *(1)*. However, as was shown previously by Sjothun and Greer *(2)* the best high-synthetic constructions in large highway truck tires (size 11.00-20) the industry was able to build were inadequate for today's severe commercial service.

GR-S TIRES

To evaluate the effect of synthetic rubber content on the performance of medium-size truck tires, a project on 9.00-20, 10-ply rating highway tires was initiated in which the test groups contained 0, 35, 50, 68 and 87% synthetic rubber, respectively. The composition of the tires obtained from five manufacturers is shown in Table I.

The tires were run on 100% pavement during the summer, fall and winter months. A speed of 45 m.p.h. was maintained at all times, even on hills and curves except as controlled by legal requirements or traffic. The tires were 45% overloaded for the first 12,800 miles and 55% overloaded thereafter based on the Tire and Rim Association's recommendations. Of the 52 tires applied 21 were still running September 2, 1953 when the project was temporarily removed. The project was reapplied October 19, 1953 and run to completion.

The choice of polymer and its distribution within the tire were left to the manufacturer's judgment to provide tires of maximum serviceability for highway operation. The same tire construction details were employed by each manufacturer in an effort to obtain more uniform testing conditions. In the 35% synthetic constructions one participant used synthetic rubber in the tread, the other used synthetic rubber in the carcass. In the 50% synthetic constructions two participants used synthetic-natural rubber blends in the tread with appropriate sidewall and body compounds and constructions to meet the requirements on synthetic rubber content. The other two participants used 100% synthetic rubber treads. In the 68% synthetic group, all participants used synthetic treads with appropriate sidewall and body compounds

TABLE I—COMPOSITION OF 9.00-20 TEST TIRES

	% GR-S				
Manufacturer	0	35	50	68	87
A	x	x	x	—	—
B	x	x	x	x	—
C	x	—	—	x	—
D	x	—	x	—	x
E	x	—	—	x	x

* Present address: Firestone Tire & Rubber Co., Akron, Ohio.

TABLE II—TEST RESULTS FOR 9.00-20 TIRES

	% GR-S				
	0	35	50	68	87
Tire durability rating	100	102	73	62	42
Tread-wear rating[1]	100	104	108	115	101
% Section growth					
From inflation	3.2	4.0	3.0	2.3	2.4
From service	2.5	2.3	2.6	2.5	2.8
Average inches of tread cracking at approximately 16,000 miles	0	0	0	4	2
% Failures in each construction:					
Tread separation	1	0	1	1	1
Ply separation	1	0	1	3	3
Tread-crack separation	0	0	4	3	1
Break above bead	3	3	3	3	0
Body breaks	6	3	3	0	0
Injuries	2	0	0	1	1
Miscellaneous	2	0	0	2	0

Average tread hardness (Shore A)[2]	O	F	O	F	O	F	O	F	O	F
Mfr. A	60	61	62	65	62	65	—	—	—	—
Mfr. B	61	59	59	59	60	60	60	64	—	—
Mfr. C	58	61	—	—	53	56	56	59	—	—
Mfr. D	54	56	—	—	58	61	60	69	57	59
Mfr. E	55	58	—	—	—	—	44	52	43	52

	% GR-S				
	0	35	50	68	87
Temperature rise, °F. above natural rubber control					
Tread Base					
Mfr. A	0	8	13	—	—
Mfr. B	0	—2	11	17	—
Mfr. C	0	—	20	26	—
Mfr. D	0	—	4	0	5
Mfr. E	0	—	—	27	22
Average	0	3	12	18	14
Contained Air					
Mfr. A	0	6	14	—	—
Mfr. B	0	7	10	13	—
Mfr. C	0	—	3	9	—
Mfr. D	0	—	4	9	18
Mfr. E	0	—	—	11	9
Average	0	7	8	11	14
Ambient temperature[3]	98	98	98	98	98
Road surface temperature[3]	128	128	128	128	128

(1) Obtained by dividing skid loss of control tire group by skid loss of experimental group; skid loss was measured with a depth gauge. (2) O =original hardness; F=final hardness. (3) At time and location of tire temperature check.

and constructions to meet the requirements on synthetic rubber content. Manufacturer A used nylon cord in all constructions, while the other manufacturers used rayon cord.

The test conditions were changed at 12,800 miles in an effort to cause the failure of all natural rubber tires prior to wearing out and still allow the high synthetic tires to run a suitable mileage to establish numerical performance rating levels. The average miles to failure for the natural rubber tires was 39,763; however, one tire was worn out at 47,841 miles and another was removed at 57,038 miles without failure. On the other hand, the 87% synthetic tires failed at an average of 14,936 miles, which is considered adequate mileage to permit a satisfactory tire evaluation.

Since essentially all tires were run to failure, it was possible to rate the various constructions for relative tire durability, which is defined as the ratio of the average total mileage for the experimental tires to the average total mileage for the controls. This method of calculating tire durability does not change the rating order, only the rating level. However, since the test conditions were changed it was arbitrarily concluded that, to rate the tires more equitably, 55% overload would be considered 50% more severe than 45% overload and thus two-thirds of the mileage at 45% overload, plus the total mileage at 55% overload, would be used in the tire durability calculations.

The ratings for each group were developed from the adjusted average mileages of tires removed due to legitimate failures; legitimate failures are attributable to tire weakness rather than to injury, defect or voluntary removal. Mileages of tires failing from injuries or defects were included only when the average group ratings were supported or improved thereby. The over-all rating for each synthetic level was obtained by averaging the various company ratings. (This is equivalent to prorating all mileages to a standard natural rubber control mileage, gives equal weight to each participant and does not give undue weight to tires which perchance ran to high mileage). The average ratings, along with other pertinent data, are shown in Table II.

Tire Durability Ratings*

The average ratings obtained for 9.00-20 tires at various synthetic levels are illustrated graphically in Figure 1. The drop in tire durability with increasing synthetic content differed from the results obtained with 11.00-20 tires *(2)* in that the 9.00-20 tires were equal to the natural rubber controls up to 35% synthetic content, whereas the 11.00-20 tires were inferior to the controls in compositions of less than 30%. At the time the tires were temporarily removed during the fall of 1953, 73% of the natural rubber tires, 50% of the 35% synthetic rubber tires and only 23% of the tires with 50% or more of synthetic rubber were running. These tires were later reapplied when the atmospheric temperature had decreased considerably. Therefore, the high mileage tires were proportionately favored during the latter part of the test, accentuating differences in performance between the natural rubber and synthetic constructions.

* In a previous publication *(2)* the term carcass durability rating was used. However, since tires are sometimes removed for causes other than carcass failure, e.g., tread-crack separation, the term "tire durability" is believed to be more appropriate inasmuch as the actual rating is based on the over-all performance of the tire.

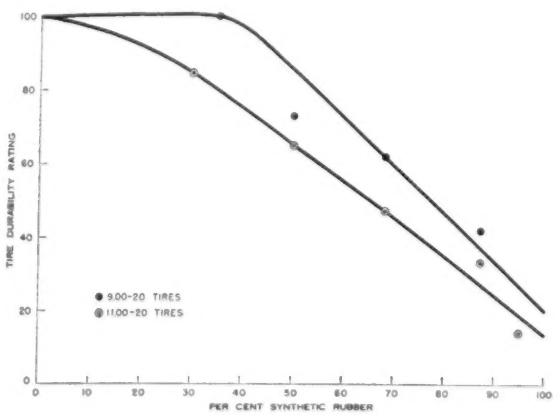

FIG. 1—Tire durability.

A comparison of 11.00-20 versus 9.00-20 tires of 30 and 35% synthetic content, respectively, shows a considerable difference in tire durability between the two tire sizes. However, as the synthetic rubber content is increased, this disparity between ratings of the two tire sizes is lessened to some extent. In both cases, beyond the range of 30 to 35% synthetic, the rapid decrease in tire durability appears to be a linear function of synthetic content.

Tread-Wear Ratings

Average data (Table II) show that the tread-wear performance for all synthetic groups was equal to, or slightly better than, that of natural rubber. The 68% synthetic group was particularly outstanding in this respect. Previous data *(2)* have shown that synthetic treads were 23% better in the summer than in the winter. Since this project was initially applied during the hot summer months, temporarily removed during the fall, and reapplied after the atmospheric temperature had decreased considerably, the effect of testing season on relative tread-wear performance was not clearly demonstrated. The fact that the synthetic treads were favored during the early stages of the test, whereas the natural rubber treads were favored by the milder conditions prevailing during the later stages, would indicate that the over-all testing season did not favor one type of rubber to the exclusion of the other for tread wear.

Another factor affecting tread performance is tread hardness. A comparison of original and final tread hardness data shown in Table II indicates that for the natural rubber control tires and the 35% and 50% synthetic tires, the hardness increase is essentially the same. However, the 68% and 87% synthetic tires showed an appreciable gain in hardness over the duration of the test. The large increase in hardness exhibited by the 68% synthetic tires may have enhanced the tread-wear performance of this group. While increased hardness generally affects tread cracking adversely, all of the tires tested were relatively free from this deficiency.

Efficiency Ratings of Rubbers

Efficiency ratings of synthetic and natural rubber are significant in determining the economics of using synthetic-natural rubber blends in heavy-duty truck tires. Shortages of natural rubber would dictate the use of larger percentages of synthetic rubber, whereas in the event of an all-out war a critical shortage of feedstocks and other chemicals necessary for the production of GR-S would require the most efficient use of synthetic. For this reason arbitrary ratings have been devised to assess the relative efficiencies of the two rubbers.

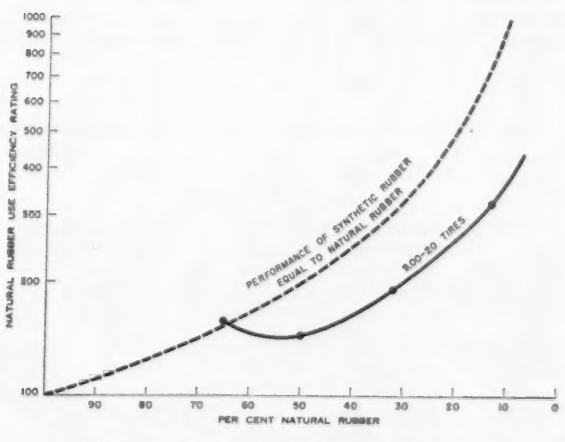

FIG. 2—Natural rubber use efficiency.

TABLE III—NATURAL RUBBER USE EFFICIENCY

% Synthetic	% Natural Rubber	Theoretical Rating	Rating
0	100	100	100
35	65	154	157
50	50	200	146
68	32	313	194
87	13	769	323

The term "natural rubber use efficiency," as applied to synthetic-natural rubber tires, is a numerical rating which indicates the relative number of tire miles to be obtained from a given quantity of natural rubber. The rating is obtained by dividing the tire durability rating by the per cent natural rubber in the tire. Assuming that synthetic rubber is equal to natural rubber for tire performance, then twice as many miles would be obtained from a given quantity of natural rubber in 50% synthetic tires than in natural rubber tires. Likewise, 67% synthetic tires would give three times as many miles and 80% synthetic tires would give five times as many miles. The natural rubber use efficiency ratings at these levels of synthetic would be 200, 300 and 500, respectively (Table III, Figure 2). In other words, this rating compares the total tire miles obtainable on one all-natural rubber tire with two 50% natural rubber tires, with three 33⅓% natural rubber tires, etc.; thus, all groups would contain the same total poundage of natural rubber.

The natural rubber use efficiency ratings calculated from the test data show good agreement with theoretical up to 35% synthetic content, but at higher levels of synthetic a marked deviation occurs, as indicated in Figure 2. In other words, the actual performance of synthetic in 9.00-20 truck tires supports the assumption that synthetic is equal to natural rubber up to a maximum level of 35% synthetic, but beyond this level increasing amounts of synthetic cause a sharp decrease in natural rubber use efficiency.

To determine the relative number of miles obtainable from a given quantity of synthetic rubber, in addition to that accounted for by the natural rubber component, a similar rating, termed the "synthetic rubber use efficiency," is employed. With natural rubber rated as par (100), the synthetic rubber use efficiency rating is calculated by subtracting the per cent natural rubber from the tire durability rating and dividing the difference by the per cent synthetic in the tire and multiplying by 100. For example, the 35% synthetic rubber tires had an average tire durability rating of 102 (Table II), of which 65 percentage points were attributable to the natural rubber component and 37 points to the synthetic compound. The synthetic rubber use efficiency rating is $37/35 \times 100$ or 106.

A rating in excess of 100 would indicate, therefore, that additional mileage is obtained from the synthetic rubber in 65% natural rubber tires. However, the synthetic rubber use efficiency rating dropped sharply at the 50% synthetic level and continued to fall with increasing amounts of synthetic rubber (Table IV). Thus, by increasing the synthetic content of 9.00-20 truck tires in excess of 35%, the additional mileage obtainable from the synthetic component decreased markedly.

In addition to the use efficiencies of natural and syn-

TABLE IV—SYNTHETIC RUBBER USE EFFICIENCY

% Synthetic	Rating
35	106
50	46
68	44
87	33

thetic rubbers, the economics of the synthetic level must also be taken into consideration in tire construction. The relative cost per tire mile at three levels of synthetic tire cost is illustrated graphically in Figure 3. Computations are based on the tire durability ratings (Table II) at the various synthetic levels for 9.00-20, 10-ply rating tires. The graph shows that at equal tire cost the relative cost per tire mile for a 35% synthetic tire is 2% less than that for a natural rubber tire, but above that point the relative cost per tire mile increases rapidly. For example, the relative cost per tire mile for a 68% and 87% synthetic tire is 60% and 138% more than that of a 35% synthetic tire. With the cost of a synthetic tire equal to 0.6 and 0.8 times the cost of a natural rubber tire a definite cost advantage would be realized up to approximately 65% synthetic level. However, above this level the relative cost per tire mile increases sharply.

Tire Temperature

In order to provide information concerning the hysteresis properties of the tires of different synthetic rubber contents, temperature readings of the tread base, contained air and atmosphere were obtained daily for the first ten consecutive days of test on each tire. Tread base temperatures were taken by injecting a thermocouple needle into the shoulder rib, normal to the tread surface, to a depth of 1.05 inches to a point just above the outside plies or breakers. Contained air temperatures were obtained by using a standard replacement valve and thermocouple adaptor with a thermocouple length of 13.25 inches from the grommet to the thermocouple junction. The contained air temperatures were taken simultaneously with the tread temperature measurements, an operation which is normally completed one minute after the truck comes to a stop.

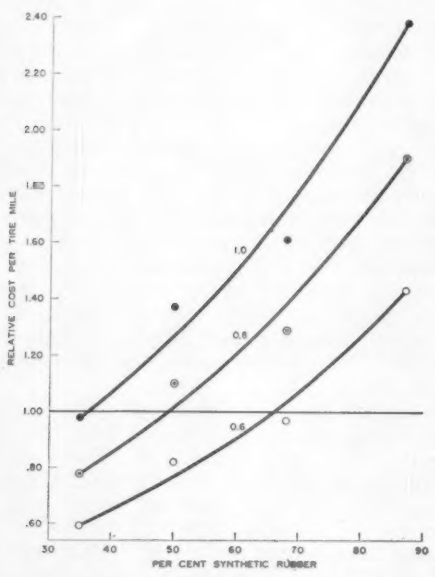

FIG. 3—Relative cost per tire mile (9.00-20 tires).

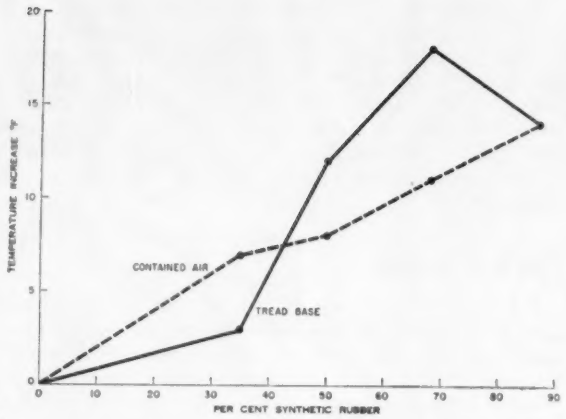

FIG. 4—Increase in tire temperature (9.00-20 tires).

The increase in tread base and contained air temperatures over that of the natural rubber controls for the 9.00-20 tires (Table II) are comparable to those previously reported for 11.00-20 tires *(2)*.

In general as the synthetic rubber content increased the tread base temperatures increased rather sharply. The contained air temperatures rose more gradually but at 35% synthetic content the tread base temperature was lower than that of the contained air (Figure 4).

Another method of assessing the hysteresis properties of tires is to measure the power loss which results when a tire is driven against a rotating drum at a constant speed of 45 m.p.h. This is accomplished by means of two dynamometers one of which functions as a motor to drive the tire while the other is connected to a steel drum 14 inches in width and 1/300 mile in circumference and functions as a generator. The difference in measurements between input power (motor dynamometer) and output power (generator dynamometer) provides the necessary data for computing horsepower loss.

The tires, inflated to 70 psi, are tested under loads of 80, 100 and 120% of maximum rated load after a preliminary break-in run of 16 hours at 45 m.p.h. under 60% of maximum rated load. The ambient temperature of the air around the tire and drum are maintained at 100°F. Contained air temperatures are also measured

TABLE V—TIRE TEMPERATURE RISE, °F, AND POWER LOSS

	Fleet				Indoor Test	
	9.00-20 Tires		11.00-20 Tires		11.00-20	
% Synthetic Rubber	Tread Base	Contained Air	Tread Base	Contained Air	Contained Air	H. P. Loss
0	0	0	0	0	0	4.79
30	—	—	11	6	8	5.33
35	3	7	—	—	—	—
50	12	8	10	11	10	5.47
68	18	11	16	14	14	5.77
87	14	14	—	—	—	—

TABLE VI—COMPARISON OF TEMPERATURE OF 9.00-20 TIRES RUN INDOORS AND ON TEST FLEET

Group	Tread	Carcass	% Synthetic Rubber	Indoor: Power Loss H. P.	Indoor: Contained Air Temperature °F.	Fleet: Contained Air Temperature °F.	Fleet: Tread Base Temperature °F.	Tire Durability Rating
A	Cold Rubber	Natural Rubber	45	4.6	207	205	234	100
B	Cold Rubber	Cold Rubber	87	4.7	207	204	233	121
C	Cold Rubber	Neoprene GR-T	97	4.2	195	199	226	63
D	Neoprene GR-T	Cold Rubber	92	3.5	196	203	203	50
E	Neoprene GR-T	Neoprene GR-T	97	3.3	186	194	203	67
F	Natural Rubber	Natural Rubber	0	3.8	196	196	212	128

during the operation by means of a thermocouple inserted into the inner tube for a distance of 6.0 ± 0.5 inches from the base of the valve stem. Standard deviations of power loss and temperature measurements obtained in this manner are of the order of 0.15 to 0.20 horsepower and 3.0° to 5.0°F., respectively.

Data are presented in Table V in which horsepower loss and contained air temperature obtained in this manner for 11.00-20 tires are compared with tread base and contained air temperatures taken under actual service conditions. Although the performance levels of these tires drop off markedly with increasing synthetic content, the increase in tire operating temperature is not large. The above data also indicate that in the 11.00-20 tire there is an increase of approximately 15°F. for an increase of one horsepower.

NEOPRENE TIRES

The failure of synthetic rubber to give good performance when used at a high level in truck tires has generally been attributed to its high hysteresis and weak hot tensile properties. A notable exception is neoprene. The strong tendency of neoprene to crystallize under strain *(3)* probably accounts for its high normal and hot tensile properties. Power loss studies have indicated that tires made of Neoprene GR-T are at least equal, if not superior, to the natural rubber controls for hysteresis.

Data presented in Table VI show that tires of high Neoprene GR-T construction exhibited the lowest power loss, as well as the lowest running temperature in indoor tests. The same general trend was observed under actual service conditions. However, the performance ratings of the neoprene tires at the Government Fleet were poor, as indicated by Table VI. Failures of the neoprene tires were due chiefly to tread and ply separations, indicating adhesive or cohesive weaknesses. These results, along with those obtained on other truck projects, indicate that the amount of heat generated may not be as important as where the heat is generated. High carcass temperatures generally promote high carcass growth; however, this is not necessarily true of high tread base temperatures. It is noteworthy that in the tires in groups D and E (Table VI), the treads and breakers of which were constructed of Neoprene GR-T, tire growth, as measured by per cent increase of average sectional diameter, was the least of all tires tested.

The results of service performance tests appear to indicate that the use of a high synthetic content in large truck tires awaits not only an improvement in polymer hysteresis, but requires compounding or construction changes to improve ply separation and cut-growth resistance, as well as general fabricating properties.

SODIUM RUBBER TIRES

That high tread base temperatures do not necessarily induce high carcass growth is indicated by another project on 9.00-20 tires comparing a sodium-catalyzed 75/25 butadiene-styrene copolymer, made in the Government Laboratories (University of Akron) pilot plant, against cold rubber in carcasses. The data summarized in Table VII show a pronounced superiority for the sodium-catalyzed polymer in this test.

The tread base and contained air temperatures of the tires made from cold rubber and sodium-catalyzed rubber were practically identical, yet the latter showed an exceptionally high tire durability rating. No natural rubber controls were included in this test.

Possible Correlations

On the basis of tire test data presented, it is difficult to make any direct correlation between tire operating temperatures and tire durability ratings for all types of synthetic rubbers. Tires built from GR-S appear to develop higher temperatures and to fail at lower mileages as the synthetic content is increased; neoprene tires developed less heat but failed at low mileages for causes other than temperature, and sodium-catalyzed rubber tires exhibited running temperatures equivalent to those of GR-S but were far superior to the latter in tire durability. These apparent anomalies are difficult to resolve on the basis of tire test results alone.

Perhaps it is significant to note that laboratory tests have shown the sodium-catalyzed polymer to be superior

TABLE VII—TEST DATA FOR SODIUM-CATALYZED POLYMER IN 9.00-20 TIRES OF 68% SYNTHETIC CONSTRUCTION

	Miles to Failure	Tire Durability Rating	Temperature °F.: Tread Base	Temperature °F.: Contained Air	% Growth
Cold Rubber.....	28,856	100	216	198	2.91
Sodium-Catalyzed Polymer	48,237	167	216	196	2.71

to emulsion polymerized GR-S in processing and flex crack growth-hysteresis balance *(4, 5)*, though equivalent in tensile properties. This, together with the fact that earlier studies have shown sodium polymers to contain a higher percentage of 1,2-addition units in the polymer chains *(6, 7)*, and a relatively narrower molecular weight distribution *(8)*, may constitute the essential differences between the two polymers. However, the effect of differences in the inherent structural features of synthetic polymers on carcass integrity has not been demonstrated.

The failure of neoprene in carcass applications must be associated with factors other than hysteresis. Since failures in the neoprene constructions were due chiefly to tread and ply separations, deficiencies in compounding or an imbalance of dynamic properties between the various components of the tire seem to be indicated.

Summary

Medium size truck tires (9.00-20) have been developed, containing 35% synthetic rubber, which equal natural rubber tires in performance. An increase in the synthetic content above 35% is accompanied by a linear decrease in tire durability, a slight gain in natural rubber use efficiency, a sharp drop in synthetic use efficiency, and an increase in the relative cost per tire mile.

Synthetic treads are equal to, or slightly better than, natural rubber treads in resistance to wear. Tread base and contained air temperatures increase with increase in synthetic content. Truck tires of high neoprene content ran slightly cooler than the natural rubber controls but failed at low mileages because of tread and ply separations. Tires built from sodium-catalyzed rubber show superior tire durability ratings when compared against cold rubber, although running temperatures for both groups were equivalent.

The future application of synthetic rubber as a carcass stock for heavy duty truck tires apparently depends not only on improved hysteresis properties, but on compound and construction improvements that will give better separation and cut-growth resistance, as well as better fabricating properties.

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Nitrile Latices as Warp Sizes for Blue Denim Yarn

IT has now been commercially established that the application of Hycar latex finish greatly improves the abrasion resistance of denim. Since denim is primarily a warp fabric, it was logical to consider the use of nitrile latex as a warp size which would also provide permanent abrasion resistance. The following data on nitrile latices as a warp size was taken from a recent talk on the subject by Neil H. Sherwood of the B. F. Goodrich Chemical Co.

Extensive laboratory work at Southern Research Institute proved the feasibility of using Hycar nitrile latex to replace starch as a warp size for the blue denim yarn. Using this information, mill scale runs were made employing latex slashing, and denim fabric was made from these yarns. These runs bore out the information found in the laboratory, namely, that Hycar nitrile latex could be handled successfully in regular cotton slashers for sizing blue denim warp yarn, fabric could be woven on regular looms from such yarns, and the resulting fabrics would have improved abrasion resistance.

The nitrile latex size provides a permanent finish. Many materials are now used which coat yarns or fabrics and afford a measure of abrasion resistance. However, many of these are not permanent to laundering and while present in the fabrics result in a stiff, boardy and generally uncomfortable cloth. The use of Hycar latex as a warp size provides a soft, pleasant feeling fabric which changes little in hand upon washing, and provides permanency of abrasion resistance.

Abrasion tests on textiles are always viewed with skepticism and various types of abrasion tests do not always correlate. However, data are available which indicate the value of Hycar sizing by three different laboratory tests. The washed fabrics were compared by two normal methods on the Taber Abraser and the Stoll Universal Wear Tester. A third method was also run using the Stoll tester. In this latter case, twenty warp yarns were stripped from the fabric, spaced over a one inch width, and run in the Stoll flex test much like a small warp sheet. Regardless of the type of test, the Hycar-sized fabrics showed improved abrasion resistance over the regular starch-sized counterparts.

A limited wear test has also been completed which confirms these results. A dozen blue jeans each, of Hycar-sized and starch-sized denim, were distributed among small boys in Clemson, South Carolina. Each boy had one pair of starched jeans and one pair of Hycar jeans and gave them equivalent wear. In every case the starch-sized jeans wore out at the knees before the Hycar-sized jeans.

The affinity of nitrile latices for both pigments and fibers is shown by one of the outstanding properties of blue denim made by Hycar warp sizing. As is well known, blue denim warp yarns are dyed by simply depositing layers of indigo platelets on the surface of the cotton yarn. There is a minimum of penetration of the indigo into the yarn bundle, while penetration into the fiber is essentially zero; thus, the indigo dye particles have only fair adhesion to the yarns. This results in a source of considerable worry and trouble for the housewife for blue denim jeans and work clothes must normally be washed separately. However, when the warp yarns are sized with Hycar nitrile latex, the indigo particles are bound onto the yarns to the extent that there is essentially no color transfer with the ASTM No. 3 wash test, even on the first laundering.

Vinyl Stabilizers and Calender Roll Build-Up

By F. R. HANSEN and S. F. DENNIS
Ferro Chemical Corporation, Bedford, Ohio

FOR some time the vinyl calendering industry has been plagued with a will-o'-the-wisp phenomenon, called "roll build-up" or "plateout", which results in a troublesome deposit on calendering and embossing rolls. For the happily uninitiated, "plateout" is the departure of pigment from the resin mass, where pigment belongs, to the surface of the calender rolls, where pigment definitely does not belong. After a period of operation during which plateout has been taking place, the calender rolls are coated irregularly with pigmented material, which destroys their original surface. The end result may be that the film either is streaked or spotted or that adjacent layers stick together. Such a situation has many times caused serious production delays, while rolls were cleaned and attempts were made at reformulation to overcome the difficulty, but all too often the result has been only costly repetition of the original difficulty. To make matters worse, the deposit at times has come and gone for no apparent reason; what seemed to be a solution to the problem in one plant failed in another, and certain constituents which apparently produced deposit in some plants were used successfully elsewhere.

For a period of about fifteen months we have been conducting test work in our laboratories along with investigations in the field in an effort to determine what causes plateout and what can be done about it. At the moment we consider our investigation by no means complete, but we have arrived at some practical solutions for stabilizing to different requirements—such as no sulfur staining, low order of toxicity, high order heat and light stability—at the same time eliminating or at least greatly reducing plateout. We believe this information should be communicated to the industry as promptly as possible, even though we must consider it in some respects as still tentative.

Initial Steps in Investigation

The first step in our investigation was to determine the composition of the deposit appearing on calenders when plateout occurs. At that time we were working with a straight polyvinyl chloride (PVC) resin, plasticized with di-2-ethyl hexyl phthalate (DOP) and stabilized with a conventional barium-cadmium laurate plus chelator. In our first tests we used titanium dioxide as pigment and found that the deposit consisted entirely of barium-cadmium laurate plus titanium dioxide. As a matter of fact, even the barium: cadmium ratio in the deposit was identical with that of the original stabilizer. This seemed to indicate that some sort of physical entrainment of the barium-cadmium stabilizer with the incompatible components must have occurred, since it would be highly unlikely that both barium and cadmium laurates would be affected in exactly the same way by all the factors contributing to plateout.

From the composition of the deposit we concluded that probably plateout could be controlled by manipulation either of the stabilizer or of the pigment. Since our primary responsibility lies in the stabilizer field, we concentrated on that end of the problem.

A method for making quantitative estimates of plateout obviously was desirable, and so for this purpose we developed two tests, one using titanium dioxide as pigment, and the other using Watchung Red. Watchung Red was chosen for its known propensity to plate out badly. The test procedure was the following:

The formulation containing resin, plasticizer, stabilizer, and either 10 phr (parts per hundred resin) titanium dioxide or .1 phr Watchung Red is worked on a two-roll 12 x 6 inch Thropp mill at 320°F. for 10 minutes, during which time build-up occurs to greater or lesser extent, according to the specific composition of the system. Then a "clean-up" sheet is milled for 10 minutes at the same temperature, while the pigment previously deposited onto the rolls is absorbed into the clean-up sheet.

In the "white test" a clear is used for clean-up and degree of clouding indicates the extent to which plating-out has occurred. In the "red test" a white clean-up sheet is used and intensity of the pinkness of the white is the criterion. Between tests, the rolls are cleaned of any remaining film by milling for 10 minutes at 320°F. using the following composition (by parts):

Polyvinyl chloride resin	100
Di-2-ethyl hexyl phthalate	40
Alcoa Hydrated Alumina C-730	10
Carborundum	5
Basic lead carbonate	2

Our experience indicates that there is a fair degree of correlation between the "red" and "white" tests as well as between these tests and reports from the field. In most cases the red test is more severe than the white.

Using the red and white tests and varying formulations as to stabilizer system, resin type, and plasticizer, we have made the following observations:

(a) Stabilizer type may affect markedly the degree to which plateout occurs.

(b) Change of resin type or plasticizer can cause some shift in the amount of plateout observed. In our work the effects of resin and plasticizer, while measurable, were not nearly as pronounced as the effects of changing stabilizer systems. This generalization is not meant to hold necessarily for unusual formulations, since our investigation did not include them.

Analysis of the Results

In analyzing the effects of varying stabilizer systems we found that two factors seemed to be of primary importance. These were: (1) the compatibility of the resin-plasticizer-stabilizer-pigment system, and (2) the state of the metallic surface with which the resin system was in contact.

Considering first the resin system, it is well known that PVC and DOP are compatible with each other. However, stabilizers as a rule are either incompatible or only partially compatible with PVC and DOP; most pigments are quite incompatible. It would appear that the two incompatible components are almost forced to be

TABLE I—EFFECT OF STABILIZER SYSTEMS ON PLATEOUT

(Basic Formulation: Geon 101—100; DOP—47)

Stabilizer System *	Type	Epoxy	phr Added Lubricant	Red Plate-out Rating†
2 Ferro 1820 1 Ferro 903	Ba-Cd laurate Chelator	No	0	4
2 Ferro 1820 1 Ferro 903	Ba-Cd laurate Chelator	No	.75	3
2 Ferro 1206X	Ba-Cd carboxylate + chelator	Yes	0	4
2 Ferro 1206X	Ba-Cd carboxylate + chelator	Yes	.25	3
2 Ferro 1206X .2 Ferro 700	Ba-Cd carboxylate + chelator Zn octoate	Yes	0	2
2 Ferro 1206X .2 Ferro 700	Ba-Cd carboxylate + chelator Zn octoate	Yes	.25	1
1 Ferro 1970 1 Ferro 903	Ba-Zn laurate Chelator	Yes	0	2
1 Ferro 416N	Cd-Ba stearate-laurate	Yes	0	1
.6 Ferro 180 1 Ferro 203X	Ba laurate Cd octoate + chelator	Yes	0	3
.75 Ba stearate 1 Ferro 203X	Ba stearate Cd octoate + chelator	Yes	0	5
2 Ca stearate 1 Ferro 700	Ca stearate Zn octoate	Yes	0	4
.7 Ferro 650 1 Ferro 700	Ca acetoacetate-acetate Zn octoate	Yes	0	2
2 Ferro 203X	Cd octoate + chelator	Yes	0	1–2
2 Ferro 203X	Cd octoate + chelator	Yes	.25	1

* Quantities designated as parts per hundred resin (phr).
† Rating Scale: 1—No plateout; 2—Very slight plateout; 3—Slight plateout; 4—Moderate plateout; 5—Heavy plateout.

drawn together because of their rejection by the matrix material. Therefore, it is not surprising that these materials appear together in the roll deposit and, further, it appears that solving the problem by attack on this factor would involve trying to enhance the solubility of either stabilizer or stabilizer-and-pigment in the resin mass.

Taking the next factor, the effect of the metallic surface, we are reminded that many polar compounds—that is, compounds having a separation of electric charge within the molecule—have the ability to form films on metals. Much careful work has been done both in fundamental research and in the fields of extreme pressure lubrication and prevention of corrosion of metals to elucidate the mechanisms by which these coatings are formed. The general theory goes something like this: Molecules having one polar end attached to a long-chain hydrocarbon group are those most attracted to metallic surfaces. They form a monomolecular coating, with the polar ends next to the metal and the hydrocarbon tails projecting at right angles from the metal surface. The coating is the more impervious to chemical displacement as the hydrocarbon chains are made longer and less branched and as the strength of bonding between polar groups and metal increases.

A familiar example of the same type of phenomenon is the spreading of oil on water. Pure, clean mineral oil does not spread on water. However, oil that has been oxidized or contaminated with the proper materials will spread on the surface of water until, if its spreading is not limited by the available area, it has formed a film just one molecule thick. The polar oxidized groups in the oil molecules align themselves so as to face into the water, and the hydrocarbon portions remain facing away from the water, forming the film that gives us the beautiful, iridescent colors on top of some mud puddles after a rainy day.

One type of polar compound having a conspicuous ability to coat metal in this manner is the metallic soap group. Metallic soaps, of course, are normal constituents of stabilizer systems. Therefore, the metallic soaps not only are prone to rejection from the resin mass because of their incompatibility, but also are attracted to the metallic surface by reason of their ability to form such coatings.

Another class of compounds that can bond well to metals are the long-chain carboxylic acids. These form stronger coatings than do the metallic soaps because they can actually bond chemically with metal, losing the acidic hydrogen. Therefore, metallic surfaces coated with organic acids are not easily attacked by other polar compounds. It is for this reason that acids sometimes are the best corrosion preventives.

Factors Affecting Plateout

Looking at both factors together, it would now seem that any modifications of an operation that changed either the compatibility of the components of the resin system or the state of the surface of the metal rolls might have an effect on plateout. In our work we have found that the following factors do have such effects:

(1) Change of the organic radical of the anion used to carry the metallic stabilizers can change the degree of plateout. A change of this type probably would modify both compatibility and tendency to coat metal.

(2) The particular metals chosen to form the metal soaps influence plateout markedly. Barium, a highly electropositive metal, probably is the worst offender. Cadmium and zinc, which are less electropositive, are not trouble-makers. Barium-cadmium systems can be adjusted so as not to plate out, if the barium:cadmium ratio is low. In formulations which must contain higher barium:cadmium ratios to meet heat stability requirements, plateout can be remedied by incorporating a third relatively less polar metal into the system. (For example, we have found that a small amount of zinc added to a barium-cadmium system depresses plateout.)

(3) Adding an acidic lubricant to the formulation reduces plateout appreciably. Stearic acid, commonly used in calendering operations as a general lubricant, also reduces plateout. Probably the acid deposits preferentially on the steel roll surface so that the metallic soaps then are not attracted. Although stearic acid undoubtedly is the most economical lubricant for this purpose, it is not always altogether satisfactory because of its tendency to "spew" from film. Where this becomes a problem, special non-spewing lubricants may be substituted.

(4) Certain sodium organophosphates contained in some commercial light stabilizers apparently have the ability to coat metals and can reduce plateout in a fashion similar to that of the acidic lubricants.

(5) Certain fillers, especially some of the aluminas, added to the vinyl formulation reduce plateout. Probably they adsorb the metallic stabilizers more strongly than do the steel mill rolls and this accounts for their inhibiting effect.

(6) Working temperature can affect the appearance of plateout, higher temperatures exaggerating the effect.

In Table I are listed a number of specific formulations together with their ratings in the "red test". A rating of 1 signifies a perfectly white clean-up sheet, 5 indicates a violent red, and the other ratings are intermediate. Most of the observations listed in the preceding section are illustrated by the examples included in the table.

In the course of our work we have come across some phenomena that would seem to upset some fairly widely held ideas. For example, many vinyl technologists have supposed that excessive lubricity in a formulation con-

tributes to plateout. In our work we have found that Ferro Experimental 416N, considered quite highly lubricating, shows no tendency to plate out in the laboratory tests. This material, however, contains no acidic lubricant. Against the background of our other work to date, we would have to consider this anomalous. However, it is to be remembered that plateout is to a considerable degree a problem involving surface reactions. Such reactions occurring in undetectable amount at the interfaces of systems and not in the bulk phases are often exceedingly difficult to isolate and explain.

Relation to Actual Production

Getting down to practical problems, we are strongly convinced that in spite of the fact that we have been able to draw a number of general conclusions about plateout based on laboratory work, real plant problems should be approached in the trial-and-error mood with the laboratory acting as guide. So far we have not been able to calculate a plateout factor. Extraneous variables as yet unappreciated may be involved.

The thought has occurred to us that in plant operations one of these may be the history of the calender roll surface. In the laboratory procedure we are always using a mill that has been cleaned so that it is free from any coating that might have been deposited from a previous time. Our duration of milling is short. However, in production calendering some calender rolls may have been exposed for long periods of time to special formulations which might contain some other surface-active agents.

For example, some of the components currently popular in vinyl formulations bear some chemical resemblance to the chlorine-, sulfur-, and phosphorus-containing materials used in the manufacture of extreme pressure (EP) lubricants. The EP lubricants owe their effectiveness in causing automotive hypoid gears to function properly to their ability to corrode metallic surfaces mildly, forming a layer of low yield strength.

It seems possible or at least worth investigating, that the behavior of a calender with respect to plateout may be quite different after a long run on a formulation containing such a material as one of the sulfur-tin stabilizers. This sort of possibility may be only one of many potential variables in plant practice.

In conclusion, we hope that this recapitulation of our ideas will be of help to the vinyl industry generally, that some of our observations may serve as leads in solving knotty plant problems, and that others who have been preoccupied with "plateout" will be moved to communicate their ideas and reactions back to us.

Riverlake Belt Conveyor Line

SOME additional information has come to light on the planned 105-mile, two-way belt conveyor line, proposed by the Riverlake Belt Conveyor Line, Inc., which would transport millions of tons of iron ore south from Lake Erie and coal north from the Ohio River. Legislation touching on "eminent domain" is necessary before the line can become a reality.

The Riverlake belt conveyor actually will run overland within a completely enclosed steel galley about 22 feet above ground level and supported on steel trestles. Running the year round, the conveyor line will be electrically powered and push-button operated. The entire line will consist of a series of belts, called flights, which vary in length, depending upon land contour and other problems. A total of 172 flights will be required for the entire distance.

It now is estimated that the ore belt, moving south, will be 48 inches wide, and the coal belt, moving north from the river, will be 72 inches wide. Freighters bringing in either Minnesota or foreign ore will be unloaded at the Lake Erie terminals by high capacity huletts directly upon discharging belts. A system of surge bins and inland storage areas will separate different consignments and give the system flexibility.

Northbound coal will be lifted from river barges at the East Liverpool terminal and moved directly to mills or to storage areas for later dispatch. It is expected that a large volume of coal will be conveyed directly to the holds of vessels at the lake terminal for transshipment to Great Lakes, Eastern Canada and foreign ports.

Moving at an average rate of speed of 600 feet per minute, the northbound coal belt will be able to carry 3,400 tons an hour and the southbound ore belt upwards of 5,400 tons an hour, depending upon belt width. The minimum annual volume anticipated is 30,000,000 tons of coal, ore and stone a year but the system is capable of handling about 52,000,000 tons per year. Freight savings will vary in relation to volume but will range from $20,000,000 to $45,000,000 a year.

Syntactic Plastic Foams

UNUSUAL lightweight plastic materials, called syntactic foams, with a cell structure like wood but easily controlled densities and strengths, have been developed by the Bakelite Company, a Division of Union Carbide and Carbon Corp. These materials, previewed at a meeting of the Society of the Plastics Industry in Los Angeles, Calif., are designed for a variety of uses, such as to reinforce boat hulls, insulate air-conditioners and refrigerators, and stiffen airplane wing structures.

Unlike conventional plastic foams, these new lightweight structures can be controlled throughout production, according to H. K. Phinney, Manager of Bakelite Company's Laminating Materials Division. Exceptionally uniform cellular structures, free of voids or dense areas, are produced by bonding microscopic Bakelite phenolic spheres together with Bakelite polyester, phenolic, or epoxy resins.

Sandwich core structures with syntactic foam as filler can save up to 50 per cent of the cost of polyester-reinforced structures due to their low density, and yet not sacrifice strength or rigidity. The tiny hollow spheres which form the cells, marketed by Bakelite under the trademark "Microballoons", were originally developed cooperatively with Standard Oil Co. (Ohio) to reduce crude oil evaporation from cone-roof storage tanks.

Low-cost sandwich structures with syntactic foam cores between glass fiber mats reinforced with Bakelite polyester resins show flexural strengths ranging from 1,700 to 4,500 pounds per square inch, tensile strengths between 1,600 and 2,900 pounds per square inch, and compressive strengths as high as 12,100 pounds per square inch. Such rigid cores reduce the flexibility of reinforced plastics without increasing weight.

These syntactic foams are relatively easy to prepare. Lightweight foams ranging from 21 to 39 pounds per cubic foot can be produced quickly and economically. Syntactic foams ranging from 10 to 14 pounds per cubic foot in density, and known as featherweights, are being tested for use in stiffening hollow aircraft wings among other possible applications.

New Type Rubber Grommet Solves Design and Engineering Problems

STALWART RUBBER CO., Bedford, Ohio, has announced the availability of what is said to be an entirely new concept of "rubber grommet" that will serve in the capacity of a pressure seal, parts positioner, vibration dampener as well as insulator. Named after its designer, W. H. Moorhead, the "Moorhead Roll-Lock Grommet" is reported to be the first unit of its kind that takes final shape after attachment. One end of the new grommet features a patented taper design, and it is this end which is inserted into the hole of product or part. Then, the cable, tubing or wire which is to be secured is inserted through the hollow center of the grommet for the desired length plus several inches. When the wire or tube is then pulled in a reverse direction, the tapered end of the grommet "rolls" and "locks" into position forming a secure seal.

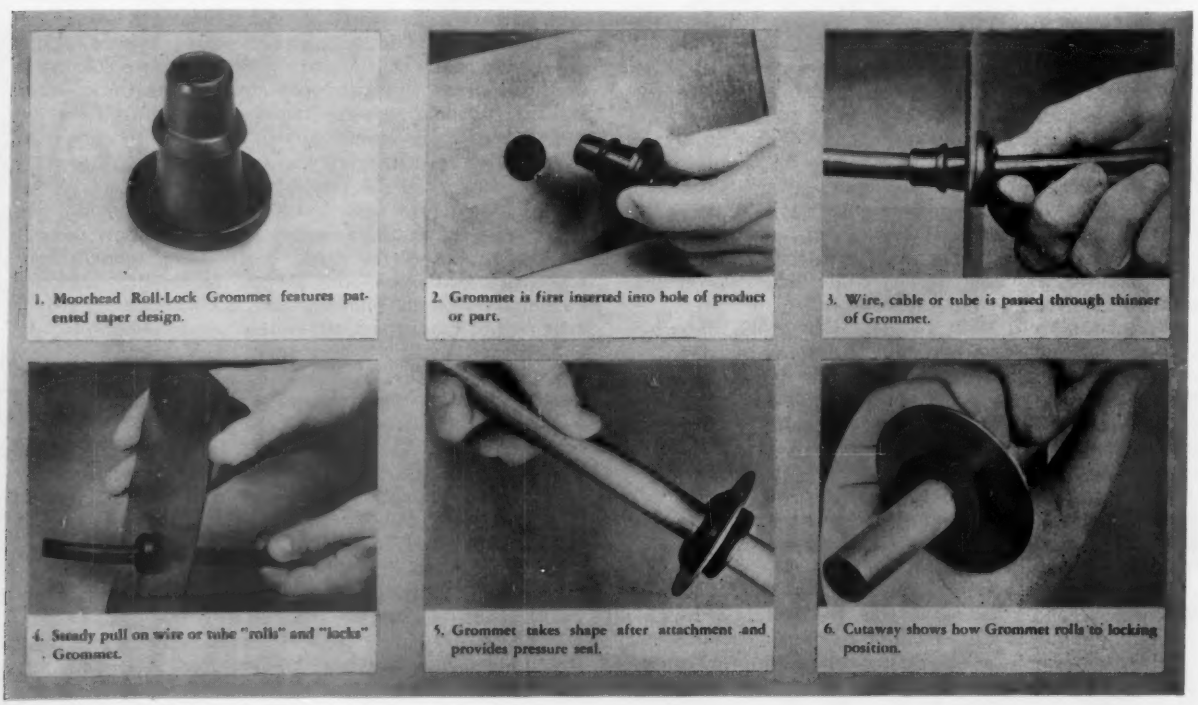
Moorhead Roll-Lock Grommets assembled on smooth tubing will provide hydrostatic pressures up to 225 psi, according to Stalwart Rubber, and higher pressures can be accommodated with only slight changes in grommet shape. In addition to serving in the conventional capacities, this new unit is said to seal against entry of water, air, dust, moisture, chemicals and solvents. It is recommended by the company for such applications as electrical assemblies where protection from hazardous atmospheres is necessary, on aircraft where tubing or electrical wiring passes from pressurized to non-pressurized compartments, in automobiles to handle the speedometer cable, or ignition wiring through the firewall, in headlight assemblies, or to provide "pull-out" protection for attachment cards on various domestic appliances.

The grommet is protected by four individual patents. Its dimensions and external shape can be varied to meet widely diversified requirements in almost every type of product manufacture. It is suitable as an abrasion-avoiding, vibration dampening shock mounting or "foot" for various bench instruments, electrical motors, portable machines, office machines, photographic equipment, lamps, etc. The physical load on the grommet can vary from that of a lightweight wire which passes through the wall of an appliance to that of a moderately heavy finished assembly. Holes into which the grommets are to be fitted can be drilled clean, flanged, or extruded.

An outstanding feature of the grommet is that it permits disassembly of wiring or tubing portions of a finished part or product. In the case of aircraft or domestic appliances where frequent inspection or repair is desirable, the grommet can be loosened and removed with the same ease that it was originally attached. The contained wire or tube is pushed or drawn in the same direction as the grommet was originally inserted and the tapered end of the unit unlocks and unrolls for rapid removal.

In addition to providing features never imposed on a conventional grommet, the new Moorhead Roll-Lock unit has equal applicational value in assemblies or equipment where pressure seal or firm containment of wiring or tubing is not required. Because of its rapid means of attachment, it can be used to protect wiring passing through sheet metal housings, and it can be utilized as a parts positioner during assembly of intricate parts or products.

Stalwart Rubber is prepared to supply the new Moorhead Roll-Lock Grommet in a wide range of sizes to meet the needs of various manufacturers. In addition, Stalwart can supply the new unit molded from standard or special rubber compounds which have been developed to resist the effects of abrasion, petroleum products, weathering, chemicals and solvents as well as temperature extremes. Grommets can be molded from high temperature resistant silicone rubber stocks when specified.



1. Moorhead Roll-Lock Grommet features patented taper design.

2. Grommet is first inserted into hole of product or part.

3. Wire, cable or tube is passed through thinner of Grommet.

4. Steady pull on wire or tube "rolls" and "locks" Grommet.

5. Grommet takes shape after attachment and provides pressure seal.

6. Cutaway shows how Grommet rolls to locking position.

Statistical Design in Compounding Elastomers

By W. L. GORE

Polychemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del.

STATISTICAL techniques for designing experiments and analyzing experimental results have become an integral part of our modern scientific method. These techniques are especially important in chemical experimentation, for the mechanisms of chemical reactions are complex and many variables are usually involved.

Experiments in rubber formulating are particularly complicated and involve many variables of procedure and manipulation as well as complex chemistry. For this reason, in the past, many rubber chemists have despaired of scientific experimentation and admitted their profession to be largely an art. More recently, quantitative measurements have been established for mechanical and chemical properties of rubber compositions, and scientific experimentation in this field has become the rule.

In this scientific experimentation, recent developments in statistical techniques for designing experiments are very useful. The basic design is, of course, the factorial,* and most chemists have gained an understanding of this design, even though they may not know it by this name. (As yet, very few of our universities include course work for chemists on recent developments in experimental design, but we hope that these important commercial techniques will soon be included in their curricula).

However, the number of experiments required for factorial designs becomes impractical in such complex situations as we usually find in rubber compounding, and it is necessary to curtail the number by using some less expansive design. In these reduced experimental designs, the information on some of the combinational effects of the variables is forfeited in order to reduce the total number of experiments. The advantage of these designs is that they give both more information and more precise information than the conventional experimental designs that many chemists are still using.

Format of Reduced Designs

Most of the reduced designs consist in Latin squares or some interlocking arrangement of this design. Therefore, an understanding of the Latin square design is important to the chemist who uses reduced or "confounded" designs. The Latin square is a symmetrical arrangement for testing the effect of three factors. For example, a chemist may wish to determine the effect of time, temperature, and accelerator concentration on the cure of a rubber formulation where the 100% elongation modulus is the criterion of the degree of cure. Specifically, he may wish to compare the effect of 150°C. against 160°C., 15 minutes against 25 minutes, and 1 part against 3 parts accelerator, in a press cure. Three alternative experimental series appear to be used in situations such as this, as follows:

CONVENTIONAL (ACADEMIC) DESIGN

(1) Control: 150°C., 15 minutes, 1 part accelerator.
(2) Temperature effect: 160°C., 15 minutes, 1 part accelerator.
(3) Time effect: 150°C., 25 minutes, 1 part accelerator.
(4) Accelerator effect: 150°C., 15 minutes, 3 parts accelerator.

FACTORIAL DESIGN

(1) 150°C., 15 minutes, 1 part accelerator.
(2) 150°C., 25 minutes, 1 part accelerator.
(3) 150°C., 15 minutes, 3 parts accelerator.
(4) 150°C., 25 minutes, 3 parts accelerator.
(5) 160°C., 15 minutes, 1 part accelerator.
(6) 160°C., 25 minutes, 1 part accelerator.
(7) 160°C., 15 minutes, 3 parts accelerator.
(8) 160°C., 25 minutes, 3 parts accelerator.

LATIN SQUARE DESIGN

(1) 150°C., 15 minutes, 1 part accelerator.
(2) 160°C., 15 minutes, 3 parts accelerator.
(3) 150°C., 25 minutes, 3 parts accelerator.
(4) 160°C., 25 minutes, 1 part accelerator.

In the conventional design the effect of each factor is measured by the contrast between a "control" experiment and a combination where only one factor is changed from that of the control. The effect so measured is restricted to the particular level of the other factors in the control, and of course no information is gained on the combinational effects of the several factors.

The factorial experiment is analyzed by comparing the average of the four combinations at one level of a factor with the average at the other level:

Temperature:
$[(1)+(2)+(3)+(4)]1/4$ vs. $[(5)+(6)+(7)+(8)]1/4$
Time:
$[(1)+(3)+(5)+(7)]1/4$ vs. $[(2)+(4)+(6)+(8)]1/4$
Accelerator:
$[(1)+(2)+(5)+(6)]1/4$ vs. $[(3)+(4)+(7)+(8)]1/4$

These comparisons are more general than the ones from the conventional design for they include a range of conditions of the other factors. Also, they are more precise, for experimental errors have been reduced by comparing the averages of four experiments. In addition, the factorial design makes it possible to examine the differences:

between temperature effects at 15 minutes and 25 minutes,
between temperature effects at 1 part and 3 parts accelerator,
between time effects at 1 part and 3 parts accelerator, and vice versa (e.g., time effects at 150°C. and 160°C., etc.).

These are the "interaction" or combinational effects between pairs of factors. The interaction effects between three factors may also be determined. Thus, the increase in temperature may have a maximum effect on modulus at 15-minute cure time with 1 part accelerator and a minimum effect at 25-minute cure with 3 parts accelerator.

Note: This article is based on a paper delivered by the author before the 62nd Meeting of the Division of Rubber Chemistry, American Chemical Society, Los Angeles, Calif., March 18-19, 1953.

*In a factorial experiment each level of each factor is tested at all levels of every other factor.

TABLE I—FACTORIAL ARRANGEMENT

Dried Magnesium Oxide

		Thiuram E		
		0 Part	0.2 Part	0.5 Part
1 part MBT	1 part S	x	—	—
	2 parts S	—	—	—
	3 parts S	—	—	x
2 parts MBT	1 part S	—	—	—
	2 parts S	—	—	—
	3 parts S	—	—	—
3 parts MBT	1 part S	—	—	x
	2 parts S	—	—	—
	3 parts S	x	—	—

Undried Magnesium Oxide (containing 11% H_2O)

1 part MBT	1 part S	—	—	x
	2 parts S	—	—	—
	3 parts S	x	—	—
2 parts MBT	1 part S	—	—	—
	2 parts S	—	—	—
	3 parts S	—	—	—
3 parts MBT	1 part S	x	—	—
	2 parts S	—	—	—
	3 parts S	—	—	x

The Latin square design requires the same number of experiments as the conventional design. The effects of the factors are determined by averaging the combinations at each level of the factors:

Temperature: [(1) + (3)]1/2 vs. [(2) + (4)]1/2
Time: [(1) + (2)]1/2 vs. [(3) + (4)]1/2
Accelerator: [(1) + (4)]1/2 vs. [(2) + (3)]1/2

No calculation of the interaction effects is possible with the Latin square design, for these interaction effects are included in the averages which are compared. This gives a generality to the experiment which is lacking in the conventional design, and the measured effect of each factor is valid over a range of the other factors. Improved precision over the conventional design is obtained by virtue of the averaging-off of experimental errors.

The great utility of reduced designs is in the preliminary experimentation to determine which variables are important. An example of this from our work with Hypalon (chlorosulfonated polyethylene) is given in the work carried out by Dr. J. J. Ondrejcin to evaluate the factors affecting the cure rate of a blend of this elastomer with an equal proportion of natural rubber. The four factors thought to be important to include in the investigation were the amount of sulfur, MBT (mercaptobenzothiazole) accelerator, Thiuram E (tetraethylthiuramdisulfide) super accelerator, and dry versus moist (11.0% H_2O) magnesium oxide. The basic formula contained the following ingredients (by parts):

Hypalon	50.0
Natural rubber	50.0
Magnesium oxide	10.0
Staybelite Resin	1.25
Titanium dioxide	80.0
Age-Rite Alba	2.0

The first measurements of cure rate were to be made from the 150°C. Mooney viscometer curve extrapolated to the "100" intercept. The 54 experimental combinations which would have been desirable are outlined in Table I. The eight combinations selected to run first are marked with an x. These eight combinations form two interlocking Latin squares with the Thiuram E, MBT, and sulfur reduced to only two levels.

The Mooney "cure" times of these eight combinations are given in Table II along with the average effect of each of the factors. Previous work with Mooney cure times had established the reliability of the measurement (by our people) to be ±2.0 units. (These are the two "sigma" or 95% confidence limits for the determination). The averages of four determinations in Table II are therefore reliable to within ±1.0 units.

Examination of these averages indicates that only the super-accelerator and moisture in the magnesium oxide have important effects on the cure rate of this composition. The sulfur and MBT need not be investigated further, but more experiments are needed to define the optimum moisture and Thiuram E for rapid cure. Also, press cures are needed to define the mechanical strength of the cured compositions.

But little information more useful than this would have been obtained by performing the 54 experiments in Table I. The reduced design enabled us to concentrate our efforts on the two important factors before much experimental attention had been wasted on inconsequential variables.

We have made enough use of reduced designs in our formulating developments with chlorosulfonated polyethylene so that we are enthusiastic about their utility. It is possible that many of the complex problems throughout the rubber industry could be solved more easily if these new experimental design concepts were brought to bear on them by rubber chemists.

TABLE II—REDUCED ARRANGEMENT: MOONEY CURE TIMES

Dried Magnesium Oxide (1% H_2O)

	Thiuram E	
	0 Part	0.5 Part
1 part MBT	(3 parts S) 19.7 minutes	(1 part S) 17.3 minutes
3 parts MBT	(1 part S) 24.6 minutes	(3 parts S) 19.5 minutes

Moist Magnesium Oxide (11% H_2O)

1 part MBT	(1 part S) 22.1 minutes	(3 parts S) 16.2 minutes
3 parts MBT	(3 parts S) 22.3 minutes	(1 part S) 11.5 minutes

Sulfur:

$$\text{Avg. with 1 part} = \frac{17.3+24.6+22.1+11.5}{4} = 18.87 \text{ minutes}$$

$$\text{Avg. with 3 parts} = \frac{19.7+19.5+16.2+22.3}{4} = 19.42 \text{ minutes}$$

MBT:

$$\text{Avg. with 1 part} = \frac{19.7+17.3+22.1+16.2}{4} = 18.82 \text{ minutes}$$

$$\text{Avg. with 3 parts} = \frac{24.6+19.5+22.3+11.5}{4} = 19.47 \text{ minutes}$$

Thiuram E:

$$\text{Avg. with 0 part} = \frac{19.7+24.6+22.1+22.3}{4} = 22.17 \text{ minutes}$$

$$\text{Avg. with .5 part} = \frac{17.3+19.5+16.2+11.5}{4} = 16.12 \text{ minutes}$$

MgO:

$$\text{Avg. with Dried} = \frac{19.7+17.3+24.6+19.5}{4} = 20.27 \text{ minutes}$$

$$\text{Avg. with Moist} = \frac{22.1+16.2+22.3+11.5}{4} = 18.02 \text{ minutes}$$

The Butyl Story

A Panel Discussion Held at the November 5, 1954, Meeting of the Chicago Rubber Group

THE November 5, 1954, meeting of the Chicago Rubber Group, held at the Furniture Mart in Chicago, Ill., featured a panel discussion entitled "The Butyl Story". W. Simpson (Chrysler) served as moderator for the session, while introductory remarks were made by W. H. Peterson (Enjay). Panel members included B. J. Ferkes (Firestone Industrial Products), C. F. Hoover (Pequanoc Rubber), K. W. Stevens (Yale Rubber Mfg.), and L. C. Peterson (U. S. Rubber). L. C. Peterson took the place of A. N. Iknayan (U. S. Rubber), who was scheduled to participate in the program but unfortunately was unable to appear. Each of the panel members presented a paper on some aspect of Butyl rubber, and these papers were followed by an interesting question-and-answer period.

In his introductory remarks, W. H. Peterson stated that Butyl is the "grand daddy" of cold synthetic rubber, pointing out that in the production of this polymer, high speed continuous polymerization takes place at −150°F. Mr. Peterson showed a film which illustrated the reaction by which Butyl is made. He also showed his audience a group of slides depicting various scenes at the Butyl plant in Baton Rouge, La.

Mr. Peterson noted that there are presently six different grades of Butyl available from the government-owned plants. These grades represent four different cure rates and three different rates of plasticity. All of the Butyl produced in the government plants contains a staining antioxidant which limits the use of Butyl to those applications where staining and discoloration are not a factor.

In recognition of the present and future requirements of the rubber industry for a non-staining Butyl, the Enjay Laboratories are presently studying and evaluating experimental and commercial antioxidants so that a non-staining and non-discoloring Butyl may be produced in the very near future.

Many persons, stated the speaker, are familiar with the work of the Enjay Laboratories to improve the properties of a Butyl vulcanizate by thermal interaction. When Butyl is hot milled with carbon black and other pigments in the presence of a promoter, the cured Butyl is more elastic, tougher, stronger, and more resistant to abrasion. In addition, compounds prepared in this manner process better on both calender and extruder operations in the factory. This technique of compounding has been successfully demonstrated in many factory trials.

Mr. Peterson said that this development is considered as a significant advance in Butyl technology, but it is presently only a tool for permitting rubber compounders to take advantage of the many excellent inherent properties of Butyl and adapt these to many new applications by overcoming some of the previously known shortcomings of a very low unsaturated polymer. "We have no illusions about the necessity for better economics for accomplishing these improved properties", he stated. The Enjay Laboratories are actively engaged in studying various approaches to do this chemically at the Butyl plant so that these improved properties may be obtained with black and mineral pigments alike when mixed in the conventional manner.

There follow herewith the papers presented by the panel members at the meeting:

Butyl Rubber—Processing and Products

By B. J. FERKES

Firestone Industrial Products Co., Noblesville, Ind.

THE fact that Butyl rubber contains such a small amount of chemical unsaturation and that this limited amount of unsaturation is further decreased during vulcanization leads to many potential advantages for compounding in mechanical goods. It is not readily attacked by oxygen, ozone, strong mineral acids, alkalies, animal fats and vegetable oils. Butyl compounds are also heat-, steam- and water-resistant, and show good weather aging characteristics as well as good electrical properties and low permeability. Many of these properties were previously obtainable only with more expensive polymers and have led to the increasing use of Butyl in mechanical rubber goods. Weatherstrips and channel rubbers and lamp pads take advantage of its good weather resistance.

Gaskets, seals and packing made of Butyl are used where good resistance to steam is required. Along this same line, steam hose can be made from Butyl compounds. Automotive radiator hose made from Butyl compounds shows excellent resistance to heat aging, ozone, water deterioration and flexing, although there is evidence that some of the rust preventatives used in anti-freeze solutions have some deteriorating effects on the hose tube.

Tank linings can also be made from Butyl compounds because of their excellent resistance to strong mineral acids and alkalies. Certain types of flotation gear take advantage of Butyl's low permeability. The high hysteresis characteristic of Butyl is advantageously used in the manufacture of vibration dampeners, particularly the crank-shaft type, and also in automotive and industrial bumpers. Butyl requires no special processing equipment and the standard rubber mixers, mills, calenders, extruders, spreaders, molding and vulcanizing equipment can be used.

In a mechanical goods plant where different polymers are processed, great care must be taken to prevent the contamination of Butyl with other materials, such as natural and other synthetic rubbers having a high degree of unsaturation. The cured physical properties of Butyl compounds can be seriously affected by small amounts of these materials. Sometimes, even unsaturated compounding ingredients can adversely affect Butyl compounds.

Butyl compounds can be either Banbury or mill mixed. In general, the same procedures used for natural rubber compounds can be used for Butyl, although Butyl does not need mastication.

The storage stability of uncured Butyl compounds is very good. Because of the inherently high degree of natural tack, however, adequate precautions must be taken to prevent sticking during storage. Also, Butyl compounds with low loadings tend to flow, particularly at higher room temperatures.

A concentrated soap dip or a good coating of soapstone is necessary to prevent slab sticking. Also, ample cooling before slabs of compound are stacked is helpful. Special compound techniques and the Polyac heat treatment can also be used to effectively reduce the cold flow of unvulcanized Butyl compounds. Because of good knitting and flow properties coupled with excellent hot tear strength, Butyl has excellent molding characteristics particularly on intricate parts or parts difficult to remove from the mold, such as corrugated boots or channel strips.

Compounding Butyl

About 1 to 1.5 parts of accelerator and 1.5 to 2.5 parts of sulfur on 100 parts of rubber are desirable. Secondary accelerators in concentrations of 0.25 to 1.0 phr are usually used to increase the cure rate and modulus in Butyl compounds. The use of the dioxime system is also employed in vulcanization with or without the use of sulfur, and provides a cure rate approaching that of "ultra" accelerators in natural rubber.

As for fillers, a wide variety of conventional rubber fillers can be used depending upon the desired final properties. The same applies to plasticizers, although smaller amounts are needed than are used in natural rubber compounding.

Colored Butyl compounds are coming into the foreground, particularly in the automotive field, primarily because black parts, while they give very good service, are certainly not appealing to the eye in this style-conscious world. Black parts become even less appealing to the eye after being in use, but a colored part will always remain an "eye catcher". Of course, colored parts have been made from natural rubber and GR-S but, in general, are not good enough. Although Butyl colored compounds may not be as resilient as colored natural or GR-S rubbers, they are far superior in age resistance and lower in cost than other synthetics having satisfactory aging properties.

Problem of Sulfur Bloom

The objectional sulfur bloom has always been a problem with colored stocks, but this has been solved by using a combination of elemental sulfur and an organic sulfide marketed under the trade name of Sulfasan R (dithiodimorpholine). Fillers used in colored stocks can be clay, calcium carbonate, hydrated calcium silicate, hydrated silica and titanium dioxide. All these can be combined with desired colors.

Many colored Butyl compounds have a tendency to stick to mill rolls and the addition of 1 to 5 parts of butoxyethyl diglycol carbonate usually stops the sticking. The inherent surface tack of cured colored Butyl parts can also be reduced by adding 0.75 to 1.0 parts of paraffin. Incidentally, the same is true of black compounds.

Generally, TMTDS to the extent of 2 phr is excellent as an accelerator and in the case of Hi-Sil-loaded compounds, the use of 2.5 phr of diethylene glycol, which speeds up the cure rate, is recommended. It is suggested that anyone interested in more details on the compounding of Butyl rubber read Ralph Wolf's article on this subject which appeared in the June, 1954, issue of RUBBER AGE.

One more point should be considered, and that is Butyl-to-metal adhesion. Adhesion can usually be obtained to most metals to which natural rubber can be adhered, but it takes a judicious selection of compounds. This ability to adhere to metal, combined with the excellent dampening properties of Butyl, may promote the use of Butyl in certain types of motor mountings.

Butyl Tubes

By L. C. PETERSON
U. S. Rubber Co., Indianapolis, Ind.

THE Butyl Story to date is largely the Butyl Tube Story. Since the first Butyl tube was made in Indianapolis in January, 1942, we have seen the Butyl tube achieve such acceptance that return to tubes of natural rubber is almost inconceivable. For many years before the advent of Butyl we were seriously concerned with these problems: (1) How to make an inner tube that holds air better; (2) How to make an inner tube that resists heat better, and (3) Improvement of tear resistance particularly after some service. The first two reflected a definite service need, and we were limited by the properties of natural rubber as we knew them.

In 1942, it began to be evident that Butyl rubber would improve certain prime features in inner tubes at the expense of some minor ones. To us it seemed quite clear that for inner tubes the potentials of Butyl far surpassed natural rubber as well as the other synthetic rubbers. Butyl tubes hold air many times (perhaps 10 to 12 times) better than natural rubber. Rubber tubes are heat aged to extinction by severe service long before Butyl tubes show much evidence of deterioration. Tear resistance of Butyl is better and more lasting than natural rubber.

Butyl Tube Field Experiences

Field experience with the early Butyl tubes showed only one major deficiency which results from a tendency to stiffen at temperatures of −10°F. and lower. Under circumstances of low inflation pressure and extreme cold, Butyl tubes are unable to recover as fast as the rolling casing in which they are mounted. This causes progressive formation of wrinkles, or what we call cold buckles, in the tube which, if extensive enough, can rub together within the air cavity, resulting in failure. A great deal has been done to overcome this deficiency of Butyl, such as the use of substantial proportions of mineral oil in the compound, high temperature cures, and proper choice of black in the tube stock. The demonstrated benefit of using relatively large quantities of oil in Butyl to improve cold weather resistance resulted in the quite general move to the high viscosity Butyl polymers GR-I 17 and GR-I 18. Today, it is common to use as much as 25 parts of oil for 100 parts of polymer and to use curing temperatures as high as 360°F.

Only in a few districts in our northern tier of states are natural rubber tubes still demanded by the consumer. When it is realized that temperatures as low as −47° are not infrequent in Great Falls, Montana, and that Duluth, Minnesota, has as many as 27 days with temperatures of −10° during the three months of December, January and February, it is possible that under certain conditions Butyl tubes might not be completely adequate. Buckling of Butyl inner tubes requires low air pressure as well as low temperature. The low pressure may not be recognized by the user since it can result from a puncture or simply the difference in air pressure resulting from mounting of tubes in a warm garage followed by exposure to such extreme low temperatures.

The use of Butyl in our factories required some changes in our methods since in many respects Butyl does not react to processing in the same manner as natural rubber. Some of these differences are a tendency to bruising such as results from sharp creasing of extruded sections. If such a piece of rubber is stretched, thinning results at the crease or fold. A similar weakness occurs when Butyl sections are joined and it is common practice to chill splices before forming just ahead of the molding process.

While uncured Butyl stocks, particularly when warm, appear tacky, uncured bonds are weak due to the lack of strength of the material itself. Momentary pressure applications, such as used for joining uncured natural rubber stocks, are usually insufficient for Butyl. Ordinary stitching or rolling does not produce laps or seams good enough to allow safe handling of assemblies. Application of sustained pressures for appreciable periods of time seems to be necessary for most assembly operations, i.e., a certain amount of dwell time, up to 4 or 5 seconds, is required.

It might be mentioned that the tube manufacturer was particularly fortunate to find that bonding of Butyl rubber to brass was relatively easy and dependable. If it had been necessary to bond some material other than cured Butyl rubber to the uncured Butyl tube sections, progress of the Butyl tube might have been delayed. The quality of Butyl valves has been excellent and even for some natural rubber tube applications, Butyl rubber valves have been used. It is easy to adhere cured Butyl rubber by the use of ordinary rubber cements to uncured natural rubber where it is not possible to adhere cured natural rubber valves to uncured Butyl by any such means.

Problem of Contamination

The most serious initial and continuing manufacturing problem arising from the use of Butyl has been that of segregating Butyl from all other polymers that may be used in the same mill room or manufacturing departments. Butyl compounds in portions as low as 1% are serious contaminators for natural rubber and GR-S. Results of such contamination are cure rate irregularities, blistered cures, and low physical properties.

Production experience has resulted in segregation of compounds by the use of such devices as colored stripes, colored liners and identification of scrap containers and the like. Segregation of mixing equipment for the use of Butyl is required. Such equipment, if it must be used for non-Butyl stocks, must be cleaned by the use of clean-up batches which are eventually discarded. Production change-over from Butyl to another type of rubber should be planned and scheduled with clean-up operations and reliable inspection.

Butyl Rubber Mechanical Goods

By K. W. STEVENS
Yale Rubber Manufacturing Co., Sandusky, Mich.

BUTYL rubber has been and is a very controversial material when considered for mechanical goods. I would like to mention some of its good chemical and physical properties and then pass on to some of the disadvantages, mentioning the means by which they may be minimized or overcome. Some of the well known good points of Butyl are:

(1) Excellent heat and weather resistance.

(2) Good chemical, water and vegetable oil resistance.

(3) Better mineral oil resistance than the general purpose rubbers.

(4) Properties of good knitting and high hot tear, making it especially good for parts with deep undercuts,

thin walls and long flow; it is very good in bellows type moldings.

(5) High gum tensile strength. This makes possible the lowest cost 30 and 40 durometer stocks of any rubber.

(6) Excellent finish from mold; this makes attractive appearing parts and keeps molds clean for longer periods of time.

(7) High elongation and low modulus when these properties are desirable.

(8) Antioxidants and protective waxes are not normally required; this may allow some savings in compound cost.

(9) Banbury mixes very well.

(10) Good processing safety.

(11) Flash can be easily removed by dry ice or liquid carbon dioxide tumbling.

(12) Low gas permeability.

Disadvantages of Butyl Rubber

Without any question the greatest disadvantage of Butyl rubber in the average rubber processor's mind is its susceptibility to contamination by other rubber stocks or unsaturated materials. This can be a very serious problem unless proper provisions are taken to prevent such an occurrence.

Good housekeeping is of utmost importance in preventing contamination. Compounding materials must be properly stored and identified. Containers must be kept clean. Mixers, mills and tubers must be free from other types of rubber. Uncured scrap must be properly identified and segregated. Since Butyl can tolerate a small amount of neoprene contamination, it is good practice to mix and tube Butyl stocks immediately following neoprene stocks. This is very helpful in preventing poor or non-curing stock.

Finally, when some stock does become contaminated, and it happens occasionally, the contaminated stock can be worked away in medium and low tensile GR-S or rubber batches. We have two heavy running GR-S recipes which carry 5% of Butyl work away as part of the batch recipe. This prevents the accumulation of any quantity of contaminated material.

Power Requirements Greater

Butyl rubber does not break down in mixing and milling operations. This requires more power than with other rubbers. It also helps shorten the mixing cycle as compounding ingredients can be added early in the cycle and at a faster rate than with other rubbers. While on the subject of mixing, I might add that batches should be mixed as hot as possible without scorching. We don't have equipment time available for the hot mixing cycles and heat soaking on mills as recommended by Enjay, but we do find a definite advantage in hot mixing with regular Banbury cycles.

There is also a tendency for Butyl stocks to stick to mixing mills. This can largely be overcome by bunching Butyl batches together and by the use of 15 to 25 parts of channel black in black batches and talc in colored batches.

Zinc stearate as a slab dusting agent rather than soapstone or talc is effective in preventing sticking to warming mills. Dusting with zinc stearate in addition to any slab dip material is also effective in preventing slabs from sticking when piled on skids. In addition, batches should be completely cooled out before piling and should not be piled too high on a skid. Skids with shelves can be used so that not over two batches are normally piled together and only one batch of 30 or 40 durometer stock.

The property of not breaking down shows up at the tuber in slow tubing rate and rough, nervy extrusions. This disadvantage has to be lived with to some extent. Maximum tubing rates can be obtained by the use of some Butyl reclaim in the compound and by finding the best tuber temperatures.

As an average, we find that Butyl stocks extrude from two-thirds to three-quarters the rate of similar GR-S and rubber stocks. Roughness of the extrusion can be lessened by using extended tuber heads and long, gradual leads on tuber dies.

Drawback to Butyl Use

A serious drawback to the use of Butyl rubber in mechanical goods is that none made in government plants is non-staining. Non-staining grades are made in Canada but are not always available. It is possible to reduce the staining of government Butyl to some extent by the use of alkaline materials, such as light magnesium oxide or lime. Replacing part of the filler load with magnesium carbonate is helpful but this tends to slow up the tubing rate.

As stated before, Butyl compounds commonly used for mechanical goods may cure slower and require more expensive accelerators than other rubbers. The estimating department needs to consider this fact in figuring the return from a given number of mold cavities. A good, tight cure is of especial importance when maximum weather and ozone resistance is desired. This can be assured by the careful selection of accelerators and by specifying sufficient curing time and temperature. These factors will also help produce good compression set compounds.

Relieving Tackiness

The inherent tackiness of molded parts can be relieved by the use of small amounts of wax, paraffin being commonly used. This prevents thin sections of flash from sticking to the parts and makes finishing operations easier.

The tendency for parts to blister in molding operations can be helped by aging the mold preparation for at least twenty-four hours and by proper mold design, including venting.

Molded Butyl parts normally develop a cloudy bloom within a few days after molding. When this is objectionable, it can be reduced or eliminated by replacing part of the sulfur with other sulfur bearing materials. Sulfasan R is recommended for this purpose.

It was mentioned previously that Butyl is advantageous in producing low durometer compounds. A distinct disadvantage is found at the other end of the hardness range as stocks of over 70 durometer are very difficult to make flow in the mold. Compounds in this hardness range should be avoided if possible. If not, molding pressures should be increased and the number of cavities decreased.

Bonding Butyl to Metal

Finally, Butyl rubber is difficult to bond to metal and when bonds are obtained they tend to be weak and erratic. The proper choice of metal primers and cover cements is very important in obtaining any semblance of a bond and usually has to be worked out for each combination of stock and metal.

Butyl Reclaim

By CLYDE F. HOOVER

Pequanoc Rubber Co., Butler, N. J.

THE rubber reclaiming industry, having in the past demonstrated its resourcefulness in converting other waste elastomers into usable products, and recognizing the economic necessity of providing a supplementary source of Butyl hydrocarbon, has successfully developed Butyl reclaims to the point where they are accepted as standard raw materials.

The inherent nature of Butyl, principally its degree of saturation and limitations with respect to curatives, proved to be an advantage to the reclaimer. Once it was established that all the major producers of Butyl passenger tubes were in good agreement with respect to formulations and quality, and that the basic raw material was of a uniform nature, the development of a reclaim from the polymer proceeded in an orderly manner. The physical properties of this type reclaim more nearly approach the properties of the basic mix than those from any of the other elastomers.

Common Manufacturing Method

The actual manufacture of Butyl reclaim is similar to that of reclaims prepared from other fiber-free waste materials. Extreme care is exercised in segregating the tubes to avoid contamination. All factories using the Butyl elastomer in its various forms are familiar with the necessity of proper segregation, and the same holds true for the reclaimer.

One of the more common methods of manufacturing follows: Valves are removed, and the tubes are cracked (sized) on a conventional heavy-duty corrugated mill. The sized stock is placed in pans with suitable oils and given a heat treatment to plasticize it properly. The heat-treated material is then banded on a mill, rough refined, strained and finished. This latter finishing operation is a second refining pass with the mill rolls set tight to deliver a sheet .002 to .004 in thickness. This material is plied up on a drum, cut into sheets and dusted. Various modifications with respect to methods of plasticizing and finishing have proven equally satisfactory. To assist the consumer in identifying this reclaim in his own plant, it is customary for the refiner operator to paint a stripe, or mark one corner, with the blue color normally associated with Butyl. The refined reclaim is extremely smooth, has a fine texture and possesses excellent uncured elastic properties.

The main application of Butyl reclaim has been as a supplementary source of hydrocarbon in passenger tubes. Tube manufacturers customarily use between 10 and 20% of the weight of their compound as Butyl reclaim. The second application in sequence of volume consumption appears to be hose, where extrusion, aging, and price qualities are of major importance.

It has been conclusively demonstrated that the reclamation of Butyl inner tubes does not seriously affect inherent physical properties. Substitution of Butyl reclaim in ratios varying from 10 to 50% of the hydrocarbon in a typical Butyl compound shows no loss of physical properties, yet allows permissible savings as great as 15% on volume costs, plus other advantages, such as reduced milling time and improved processing.

Butyl reclaim has found additional application in cements, tape stocks, channel stripping, sponge, miscellaneous molded items, wire, and extruded compounds. It has been proven that cements and tape stocks made with combinations of natural rubber and Butyl reclaims possess aging properties not obtainable from natural rubber alone. It has also been noted that a small percentage of Butyl reclaim incorporated in a mechanically blown sponge compound improves uniformity of blow and insures a firm "outer" skin.

Other applications that have come to our attention include the use of small amounts of Butyl reclaim in tacky natural and GR-S calendering compounds to assist in mill and calender release at elevated temperatures. Butyl, as you are well aware, tends to stick with low temperature milling, but releases readily at temperature of 220 to 250°F., and the inclusion of Butyl reclaim to tacky compounds tends to alleviate their sticking to the calender at high temperatures. This reclaim is receiving increasing recognition in the wire field for its cleanliness, uniformity, good aging and good extrusion properties.

I would like to comment on the physical properties and methods of evaluating present Butyl reclaim. Preliminary evaluations of this may be made, using the test formula recommended by the Rubber Reclaimers Association, which follows:

Butyl Reclaim Hydrocarbon	100.0
Mercaptobenzothiazole	0.5
Tetramethyl Thiuram Disulfide	1.0
Zinc Oxide	5.0
Sulfur	2.0

Tensile and elongation tests are generally run on a range of press cures 15, 20 and 30 minutes at 320°F. Data from the optimum cure at this temperature indicate tensile values of 1500 to 1600 pounds per square inch with elongations of 550 to 500%. Mooney viscosity readings vary somewhat among manufacturers, but generally run 55 to 70 when measured at 212°F. with the large rotor and a 4 minute reading. Durometer readings on the cured material run between 42 and 50 and specific gravities 1.14 and 1.17.

Chemical Characteristics

Chemical characteristics as determined by standard ASTM methods, indicate acetone extracts in the range of 5 to 8%, ash 6 to 10%, carbon black 27 to 30%, and Butyl rubber hydrocarbon, 54 to 58%. Information derived from these tests may be used as a basis for subsequent compounding and application.

As previously mentioned, probably the greatest percentage of Butyl reclaim is returned to inner tubes as a processing aid and supplementary source of Butyl hydrocarbon. The use of 10 to 20% of Butyl reclaim in inner tubes is predicated on its high retention of original physical properties.

Items pertinent to consideration of a product in addition to its physical and chemical properties are its availability and price. Since 1942, we have produced in

(Continued on page 771)

Wire Thread Inserts Eliminate Repairs in Tire Molds

PERIODIC repair of threaded holes fastening tread rings to tire molds has been an expensive maintenance necessity in tire manufacturing. This maintenance headache is reported to have been entirely eliminated at the B. F. Goodrich Company, Akron, Ohio, by installing stainless steel wire thread inserts in all the threaded holes in their soft-steel tire molds.

Ductile-iron or aluminum tread rings, used interchangeably in tire molds for pot-heater, steam-dome, and Bagomatic curing processes, are fastened to molds at the Goodrich plant by 20 socket-head cap screws (Figure 1). During the curing cycle, heating and cooling of the tire mold and tread ring causes uneven expansion and contraction of the cap screws and the parent materials. The resulting stresses may cause the unprotected threads to seize or strip, making it difficult or impossible to remove and replace cap screws when changing the tread ring. In addition, process steam may corrode the threads. Threads so damaged must then be repaired by drilling out the screw, plugging and redrilling the hole, and retapping the threads. Threads tapped in the back of the soft-steel mold where cap screws secure the mold to the press are subject to the same severe operating conditions and often require the same repair work.

To protect the threads from stripping, seizing and corroding, Goodrich installs twenty ½-13 x ¾ wire thread inserts (made by the Heli-Coil Corporation of Danbury, Conn.) in the mold rim (Figure 2), and ½-13 inserts, varying in length from ¾ inch to 1 inch and in number from 4 to 8 (depending on the type of mold), in the outside of the mold. Details of the insert installation in the rim of a mold are illustrated in Figure 3. No mold design changes are necessary to provide space for the inserts because they can be installed in bosses of the same diameter required for standard unprotected threads.

Cold rolled from AMS 7245-B stainless steel wire to diamond shape in manufacture, the inserts have a hard (43-50 Rockwell C), smooth (8-15 microinch) surface which reduces wear and prevents seizing, even when subjected to temperatures as high as 800°F. The flexible insert adjusts to irregularities in the mating threads, developing full thread strength and eliminating seizing caused by imperfect thread fit.

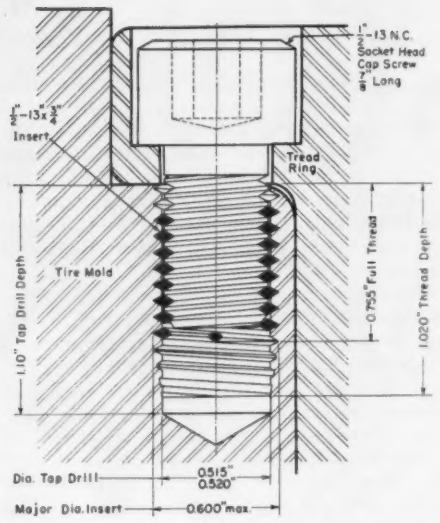


FIG. 2—Detail of wire thread insert installed in tire mold to receive socket-head cap screw which holds tread ring in place.

Installation of the insert follows standard shop practice for drilling and tapping. After the hole is tapped to the insert manufacturer's specifications, the insert is installed with a special inserting tool. All these operations can be performed with power tools. At Goodrich, drilling and tapping is done on a drill press and the inserts are installed by a hand power tool.

FIG. 1—Worker fastening a cast tread ring inside a machined tire mold.

FIG. 3—Wire thread inserts being installed in the rim of a tire mold.

How Industrial Trucks Solve Handling Problems at General Tire's Factory in Akron

MATERIAL handling in the plant of the General Tire & Rubber Company in Akron, Ohio, presents several problems and their solutions may be of interest and help to others. For instance, General operates its factory on four six-hour shifts. Because incoming raw rubber must not be contaminated by wood, all-steel pallets are used. Rubber tires, especially in the giant sizes, are one of the most difficult shapes to handle. The fast pace of production makes it necessary that plies of rubber for tire building be placed in an assembled form very close to the tire-making machines. This means that space for material handling equipment is limited.

Pallet System Utilized

All incoming raw material is either purchased for delivery on pallets or is placed on pallets right in the incoming freight car or truck. In order to move these pallets, General operates 29 rider-type trucks and 20 powerized floor trucks. These units are assigned by function. Based on past experience, a definite number of rider and non-rider type trucks are assigned to receiving, shipping and all production departments. There are industrial trucks on the first three of the four floors in the plant. Movement of material in the vertical plane is handled by elevators.

All of the twenty powerized floor trucks and many of the rider-type trucks are battery-powered. All battery-powered equipment has at least two batteries per unit and some have three batteries per truck because of the four shift operation.

All battery charging is done in one central room which is enclosed by a substantial railing to keep out unauthorized personnel. All battery handling is done by the regular battery room attendants who operate on three 8-hour shifts. A battery attendant and a truck maintenance repair mechanic are on duty during the day shift and one battery man is on duty on each of the other two shifts. Truck operators are not permitted to handle the batteries.

FIG. 1—This half of the central charging room is for large batteries for rider-type trucks. The spreader bar was designed by General Tire engineers.

FIG. 2—Earthmover tires are rolled into special rigs of this type. The rollers are brought up horizontally from each side and locked into position.

The battery room is divided into two parts, the large 12, 15 and 18-cell batteries on one side and the small 6-cell batteries for the floor trucks on the other. The space between is used for battery cleaning and washing and for changing the batteries in the trucks by means of the overhead monorail air-operated hoist.

The large batteries are charged on a platform designed to bring the tops of the batteries to an efficient working height. There are three four-circuit motor-generator sets and one single circuit set for the large batteries (Figure 1). An air blower forces air taken from outside the building underneath the batteries on charge. The air cools the batteries on charge as it flows up through the grating which supports the batteries and permits continuous charging even in hot weather. There are small motor-generator sets mounted in groups of four and five against each wall on the other side of the room for charging the smaller batteries.

Distilled water for replacing electrolyte lost through evaporation is delivered directly to the battery room from the laboratory still through permanent copper piping.

Special Spreader Bars

Because of the several different sizes of batteries used, General has developed its own spreader bars in three sizes. The hooks at the ends of the spreader bar which actually lift the battery are insulated from the spreader bar itself and from the hoist by fiber grommets (Figure 1).

FIG. 3—The two forks on this special straddle-type truck move independently of each other although mounted on the same mast. The truck is used to carry plies to the tire machines.

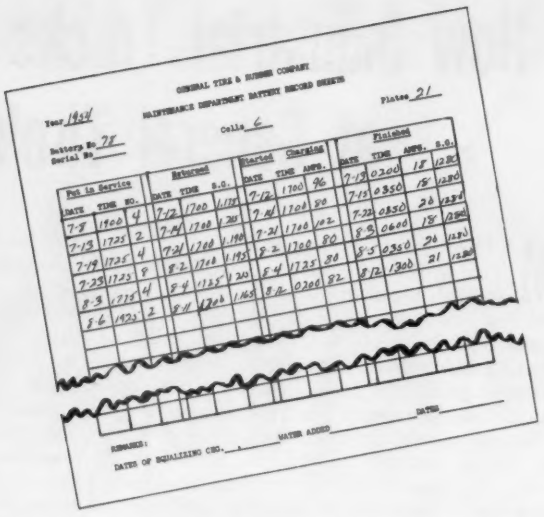


FIG. 5—Facsimile of the special form used by General Tire to keep records of each battery in operation.

Handling of the giant tires for huge earth-moving equipment is one of the most spectacular handling jobs in the General plant. Larger in diameter than the height of the average man and nearly a ton in weight, these giants formerly presented a hazardous and difficult handling job. A special rig has been developed, shown in Figure 2. The tire is rolled in an upright position into the rig. Roller supports from each side are brought up and locked into place. The rig is on casters so that the rig and the tire can be moved short distances manually.

For most handling of these giants, however, a battery-powered floor truck is used. A special projection on the lifting part of the floor truck fits into a socket on the end of the rig which raises it so that the giant tire is supported on the rollers. The front wheels of the rig are raised from the ground but the rear wheels are not.

FIG. 4—Changing of tire molds is accomplished quickly in spite of close quarters with this 1400-pound capacity boom mounted on a battery-powered floor truck.

Thus, the giant tire can be rotated on the rollers for inspection or painting and then moved into the highway trailer for shipment.

Another ingenious handling device in the General plant is the straddle-type truck with two lifting forks. Both forks operate on the same mast, one inside the other (Figure 3). The movement of each is completely independent of the other. There are two of these trucks, each one serving 36 tire machines. Located close to each tire machine are two 6-place racks. Sheets of rubber separated by cloth to prevent adhesion of the rubber layers are transported from the end of another processing line on long wooden trays. With two independently-operated forks, two trays at a time can be transported and placed in empty spaces on the rack, often simultaneously. Two empty trays containing only the fabric are removed and returned to the processing line for new material.

With the hundreds of tire molding machines in operation, it is essential that a quick and easy method of changing molds be available. This is shown in Figure 4. This permits quick mold changing where space is at a premium.

Special Records Maintained

Records are kept of each battery in operation on a special form drawn up for the purpose. The form (Figure 5) shows the date, the time and the number of the truck in which the battery is placed. In the next section is the date, time and specific gravity of the battery when it is returned to the charging room in a discharged condition. The next section shows the date and time when the battery is put on charge and the starting rate of charge in amperes. The last section shows the date and time, the finishing rate in amperes and the final specific gravity.

These forms are sent periodically to the engineering department for review. The engineers see that all are getting equal duty, that none are overdischarged, that all are brought up to the proper specific gravity at completion of charge and that improper charging techniques are changed before permanent damage is done.

Editorials . . .

Decision Pending

THE chips are now all down and complete and final decision on the sale of the government-owned synthetic rubber producing facilities to private industry rests solely in the hands of Congress. This is in accordance with Public Law 205 which established the Rubber Producing Facilities Disposal Commission. As reported last month, the Commission announced on December 28th that contracts had been signed covering 24 of the 27 available facilities. As reported elsewhere in this issue the Commission made its report to Congress on January 24. Under the Disposal Law, Congress has until March 27 to accept or reject any offer made for any one or more specific facilities.

At this writing it appears that the entire program as submitted to Congress will be approved. There will probably be slight flurries of one kind or another on the floor of both the House and the Senate, with politics injecting its sardonic face, but the flurries will more than likely be short-lived and conducted solely for the Congressional Record. If silence gives consent, then the program will have relatively smooth sailing, since there have been no public objections voiced by any Congressman since the program was submitted. It is a tribute to the negotiations conducted by the Disposal Commission that cries of "give-away" have not been raised.

How well the Disposal Commission did its job is reflected in the figures. If all sales are approved, the government will be richer by $410,565,000. This figure includes $285,465,000 for the 24 production facilities, approximately $91,000,000 which the Office of Synthetic Rubber will have on hand in cash at the time of actual sale, $24,800,000 in inventories of synthetic rubber, and $300,000 for miscellaneous equipment. According to the Commission's figures, which could possibly be subject to argument based on accounting practices, the gross book value of the 24 plants and the miscellaneous equipment as of the transfer date will amount to an estimated $488,584,000 and the net book value to $131,954,000. The total cost of constructing all 27 of the facilities which were offered for sale was approximately $500,000,000.

According to the Commission's statement, the total unrecovered cost of the synthetic rubber program to the American people is $272,918,800. This sum is composed primarily of wartime losses from rubber sales, losses on earlier plant disposals, other non-operating losses, and the net book value of the facilities. Contract sales prices, less current assets, according to the Commission, represent the return to the people of 96.6% of their total unrecovered investment. This is a remarkable return, not only for a government venture which could easily have been completely written off as a wartime cost, but for any business enterprise as well.

As for the rubber industry itself, it is awaiting Congressional approval with somewhat mixed feelings, depending on where the shoe fits. The position of the larger manufacturers is quite clear and many of the medium-size companies have their stakes protected by participation in one or the other cooperative enterprises, such as the Copolymer Corporation or the American Synthetic Rubber Corporation. The balance of the industry, representing far more in numbers but much less in volume consumption, is quite naturally concerned with two factors, namely, availability and price. The Disposal Commission has adroitly seen to the former, and the latter is beginning to take definite shape.

On the question of availability, the Commission has appropriately seen to it that every contract for a copolymer plant provides that a percentage of total annual output will be available to general industry. In addition, the complete output of the plants to be run by Phillips Chemical and Shell Chemical, somewhere in the neighborhood of 150,000 long tons a year, will also be available for general sale. Although part of this output will undoubtedly go to some of the larger manufacturers, enough of it should be available to meet the needs of the smaller ones. As a matter of fact, Phillips is understood to have agreed to offer the major portion of its production to small business enterprises.

As for the price, it will probably remain fairly close to the present 23-cents-a-pound for two or three months after the transfer date. It is no secret that Phillips Chemical has been offering to supply butadiene-styrene rubber at a delivered price of 25-cents-a-pound. Within the past few days both Firestone and Shell Chemical have announced intentions of maintaining the 23 cent price per pound plus freight charges. These statements are, of course, based on takeover, but should serve to set the price pattern for the second quarter of the year. After that? Quien sabe!

Highlights Sidelights *of the News...*

February, 1955

The Disposal Commission's report to Congress recommending the sale of 24 of the 27 government-owned facilities for the production of synthetic rubber cast some interesting sidelights on the negotiations which preceded the signing of contracts . . . With the sale of the plants, approximately $310,000,000 will be taken into the Federal treasury in addition to about $91,000,000 which the Office of Synthetic Rubber will have in cash on hand as of the transfer date . . . The Commission's success in negotiating for the sale of the facilities may be measured by the fact that the contract sales prices (less current assets) represent a return of 96.6% on the total unrecovered investment (page 731).

Notwithstanding the fact that Congress has yet to approve transfer of the synthetic facilities to private industries, the battle for markets has already begun . . . Shell and Firestone have announced a flat price of 23c a pound, f.o.b. works, for GR-S to be sold from plants purchased from the government . . . Previously, Phillips Chemical had announced a 25c price on its future production of GR-S (page 732).

What is said to be a revolutionary process for the vulcanization of rubber has been developed by the U. S. Air Force . . . The new process uses gamma radiation in place of conventional chemical and heat treating methods, Pentagon officials state (page 748).

Among the interesting technical meetings which have been held recently are the Fifth Annual Conference of the Plastics, Film, Sheeting and Coated Fabrics Division of SPI in New York City (page 738), and the 11th Annual Meeting of the Society of Plastics Engineers at Atlantic City, N. J. (page 742).

John L. Collyer, chairman of the board of the B. F. Goodrich Co., has called for a reduction of government expenditures by ending further additions to the national stockpile of natural rubber . . . Mr. Collyer places the stockpile at approximately 1,200,000 long tons valued at $825,000,000 (page 737).

The Indian Rubber Industries Association is seeking American investment participation in the establishment of a plant for the production of 150 tons of reclaimed rubber per month . . . The American investment is desired in the form of necessary machinery and technical assistance (page 741).

NEWS REPORTS and Industry Activities

DISPOSAL COMMISSION RECOMMENDS CONTRACTS FOR SALE OF TWENTY-FOUR SYNTHETIC PLANTS

ON January 24, 1955, the Rubber Producing Facilities Disposal Commission reported to Congress that it had executed contracts of sale for twenty-four of the twenty-seven plants comprising the government's synthetic rubber facilities. The contract sales price of the twenty-four plants totals $285,465,000. Additional payments by purchasers for certain raw materials, work in process, spare parts and supplies, plus net additions to fixed assets as specified in contracts of sale will amount to an estimated $300,000. Inventories of synthetic rubber as of the transfer date to be sold by the Federal Facilities Corporation would produce at current market prices approximately $24,800,000. Thus, if Congress does not reject any of the contracts during its 60-day review period, title to the plants can be transferred and some $310,565,000 will be taken into the Federal treasury. To this sum must be added approximately $91,000,000 which the Office of Synthetic Rubber of the FFC will have in cash on hand, making for a grand total of $410,565,000. The twenty-seven plants cost the government about $500,000,000 to construct during World War II. The Commission set a gross book value on the contracted-for facilities as of the anticipated transfer date of $488,584,000, and a net book value of $131,954,000. Readers are urged to consult the accompanying table which spells out pertinent details on the facilities contracted for sale.

In its report to Congress, the Commission reported that the total estimated unrecovered cost of the synthetic rubber program to the American people is $272,918,800. This sum is composed primarily of wartime losses from rubber sales, losses on earlier plant disposal, other non-operating losses, and the net book value of the facilities. A measure of the Commission's success is the fact that the contract sales prices (less current assets) represent the return to the people of 96.6% of their total unrecovered investment.

The signed contracts provide for 689,600 long tons of GR-S capacity and 90,000 long tons of Butyl rubber capacity. Both these amounts are in excess of the statutory minima of 500,000 and 43,000 long tons, respectively.

Congressional Objections

There was no immediate indication of any objection to the proposed sales in Congress. Chairman Vinson (Dem., Ga.) of the House Armed Forces Committee said he expected to have brief hearings on the report, probably with only Commission members as witnesses. Senator Fulbright (Dem., Ark.), chairman of the Senate Banking Committee, which also will handle the report, said he had no plans for a hearing, adding that the only reason he could see for hearings would be objections of some Senators to the sale. He knew of no objections at present, he added.

It is reported that quick action will be sought on bills to reopen bidding on the unsold GR-S plant at Baytown, Texas, now operated by the General Tire & Rubber Co. The trade reports that General Tire is prepared to make a new offer for the plant. At least one other group is reported ready to bid on the Baytown facility.

The other unsold facilities include the GR-S plant at Institute, West Va., and the alcohol-butadiene plant at Louisville, Ky. The 122,000 long ton Institute facility will go into standby for three years under the terms of the disposal law. The alcohol-butadiene facility at Louisville will be leased to Publicker Industries, Inc. A special provision of the disposal law permits the leasing of the alcohol-butadiene plants, but none of the others.

With the exception of the Los Angeles plant, only one proposal was received for each of the copolymer plants which the Commission has recommended for sale. In those cases, the buyer was either the present operator or a new corporation in which the present operator participated. The copolymer plant at Los Angeles drew proposals from the Standard Oil Co. of California, Minnesota Mining and Manufacturing Co., Midland Rubber Corp. with Edwin W. Pauley, Dow Chemical Co., and National Lead Co., in addition to the successful bidder, Shell Chemical Corp.

The pattern of proposals for the copolymer plants, while it served to limit the Commission's area of choice, was not entirely unexpected. In the March, 1953, Report of the Reconstruction Finance Corporation, and in the hearings which resulted in the disposal legislation, it was pointed out that the size of the facilities and the technical and financial requirements of their operation were such as to preclude their purchase by small businesses. It was further pointed out at that time that the most likely purchasers, particularly for the copolymer plants, were the present operators.

Given this bidding pattern with which to work, the Commission nonetheless believes that the program for the disposal of the copolymer plants will lead to competition among the purchasers and will safeguard the interests of small business enterprises and other non-purchasers who require synthetic rubber.

GR-S Capacity Concentration

The largest concentration of capacity, represented by the Firestone contracts, comprises only about 19% of the capacity sold. The aggregate tonnage purchased by the "Big Four" is closely related to their historic share of synthetic rubber consumption. These companies have contracted to purchase 64% of the GR-S capacity recommended for sale. In fiscal 1953, a high sales year, their purchases were 58% of government sales, and in fiscal 1954, a year in which demand was generally lower, their purchases were 56% of government sales.

The Commission is confident that effective competition for the four major rubber companies, in addition to the competition that will exist among these four, will be provided by Shell and Phillips, both chemical subsidiaries of major oil companies which have contracted for 152,000 long tons of capacity as will be seen in the accompanying table.

The 1953 RFC report also pointed out that butadiene plants are to all intents and purposes dependent for their market on

copolymer plants. Similarly, copolymer plants must have an assured supply of butadiene. It was predicted that this interdependence might well lead to cases of vertical integration, that is, single ownership of facilities for the production of both butadiene and GR-S.

This has, in fact, occurred in five instances in the program, namely, Shell, Phillips, Goodrich-Gulf (jointly owned by Goodrich and Gulf Oil), Texas-U. S. Chemical (jointly owned by U. S. Rubber Co. and Texas Co.), and the Copolymer Corp. (a combine of seven companies).

The Commission believes, however, that under the present sales pattern the various vertically integrated purchasers can be expected to compete effectively one with the other. The other copolymer plant purchasers evidenced no serious interest in the purchase of a butadiene plant. Generally speaking, however, all purchasers and their plants are of sufficient size that they should be able to participate in the rigorous competition which the Commission fully expects to see develop in industry.

There is another vitally important aspect of competition in GR-S production, the Commission believes. This is the availability of synthetic rubber to those rubber fabricators who are not plant purchasers. This group exceeds 800, the Commission states. While their numbers are large, their tonnage requirements are disproportionately small.

Historical Position of "Big Four"

Historically, the "Big Four" have purchased the bulk of the synthetic rubber sold by the government. Thus, in the past fiscal year when sales to the Big Four totaled 261,000 long tons, sales to all others totaled 204,000 long tons. Even more important is the fact that in the past year those companies who have contracted as plant purchasers bought from the government 337,000 long tons of GR-S, while government sales to all others totaled 127,000 long tons. The rubber needs of plant purchasers will, by and large, be satisfied from their plants and need cause no concern. It is the market represented by the second sales category that must be safeguarded by the pattern of disposal of the GR-S plants, the Commission declared.

The major need of these hundreds of rubber fabricators is a dependable supply of synthetic rubber. The most effective way of satisfying this demand is to place rubber-producing capacity in the hands of non-rubber fabricators—corporations with no captive demand which will have to look to the general market for the sale of their product. This, the Commission has done. Shell and Phillips alone represent 152,000 tons of capacity. Phillips has represented to the Commission that it considers its major market to be in this group of non-purchasers and has agreed that it will offer the major portion of its production to small business enterprises.

The Shell situation is in many respects similar. At the outset, Shell considers its major market to be the West Coast area. This is expected in view of the freight differential, as against Gulf Coast plants, encountered in shipping rubber east from the Pacific Coast. Non-purchasers on the Pacific Coast should be able to satisfy the bulk of their needs from this plant. In addition, Shell may well develop as an additional source of supply for non-purchasers east of the Rocky Mountains, and has stated that any rubber excess over West Coast needs will be available to the eastern market.

The Los Angeles copolymer plant is an extremely versatile one, equipped to produce hot and cold rubber, both solid and latex, of many types. Similarly, Phillips has stated that it intends to produce a wide variety of different types of GR-S in order to satisfy as high a proportion as possible of the extremely varied non-purchaser demand. Thus, these sales to Shell and Phillips can be considered a sound basis for the protection of the needs of rubber fabricators who do not purchase plants, as well as affording effective competition to other plant purchasers generally.

The Commission, however, did not stop at this point. Further measures were taken to safeguard the position of small businesses. An appendix to the contract of sale for every copolymer plant contains a commitment on behalf of the purchaser that he will offer a specified percentage or amount of his production to small business enterprises. The sum total of the amounts represented by such commitments (exclusive of Shell and Phillips which were treated above) is 90,000 long tons annually if all plants are operated at capacity.

Commitments Exceed Demand

It is apparent that the sum of these commitments, plus the 152,000 long tons of capacity represented by Shell and Phillips, exceed the present demand by non-purchasers. Production will be scaled to demand. It is likely that some of the production by Shell and Phillips will be sold to other plant purchasers who are fabricators. In addition, plant purchasers who are fabricators can be expected to sell certain amounts of rubber to each other.

Many different types of GR-S can be, have been, and will be produced, types which certain firms may find it more economical to purchase, rather than produce in their own facilities. Such inter-purchaser sale is particularly likely in the case of the plants at Akron and Naugatuck. The types of GR-S produced at these plants are for special, and limited, uses and are produced in amounts greater than their purchasers presently consume, the Commission states.

Competition in GR-S production and sale can be expected to hold the price of synthetic rubber at a fair level, the Commissioners believe. Further, such a price for synthetic is advantageous to those GR-S producers who are fabricators; those companies consume large quantities of natural rubber and to the extent that the price of GR-S is held down, it exerts a similar pressure on the price of natural rubber. These factors should, in combination, assure small businesses that the synthetic rubber made available to them by the pattern of copolymer plant disposal will be available at fair prices.

Further assurance is offered by the appendices to the copolymer contracts. The sections committing purchasers to make GR-S available to small businesses also refer to the price at which such rubber will be available; examples of the language used are: "fair market prices," "terms and conditions generally competitive with other private suppliers," "competitive terms and conditions," and "at fair prices."

What has been said above in regard to the plants at Akron and Naugatuck should serve to dispel any concern that their ownership, as second plants, by Firestone, Goodyear and U. S. would serve to afford those companies a position of undue dominance. In the first place, as has been pointed out, Firestone, with the largest percentage, has only 19% of capacity, but more important is the fact just discussed that these plants produce special types of GR-S in excess of the demand for them by their purchasers. As a consequence, much of their output will be available to the market generally.

Sales to Combinations

Worthy of additional mention are the sales to the Copolymer Corp. and American Synthetic Rubber Corp. Each of these corporations is composed of a group of smaller rubber fabricators who have combined for the purpose of purchasing a GR-S plant in order to safeguard their rubber supply. Copolymer Corp. is owned equally by seven smaller tire manufacturers, while American Synthetic is owned in various proportions by American Cyanamid (which owns one-third of the outstanding capital stock and which will act as sales agent for the company) and by 28 rubber fabricators, representing primarily non-transportation interests.

The Commission, as did Congress in the course of its consideration of the disposal legislation, viewed such companies with favor, as they enable small fabricators who are in competition with the major rubber companies to enter the field of synthetic rubber production.

In addition to competition within the synthetic rubber industry, the plants purchased will face competition from natural rubber. It was represented to the Commission that 40% of the total market prefers synthetic rubber for certain uses, 40% prefers natural rubber for certain uses, and the remaining 20% is influenced by price. Whatever the exact figures, rubber fabricators are not wholly dependent on syn-

Establish GR-S Price

As this issue went to press, the Firestone Tire & Rubber Co. and the Shell Chemical Co. announced a flat-price of 23c a pound, f.o.b. producing plant, for GR-S to be sold from plants purchased from the government. A third plant buyer, Phillips Chemical Co., had previously placed a 25c delivered selling price on its future production of GR-S.

Pertinent Data on the Synthetic Rubber Facilities Contracted for Sale

(As Reported by the Rubber Producing Facilities Disposal Commission)

Purchaser	Location	Assigned Annual Capacity †	Gross Book Value Aug. 31, 1954	Net Book Value Aug. 31, 1954	Bid Price	Selling Price	Terms
GR-S Plants							
Copolymer	Baton Rouge, La.	49,000 LT	$9,268,331	$3,397,432	$4,850,000	$5,000,000	(2)
Firestone	Akron, Ohio	30,000 LT	7,452,230	2,138,181	2,000,000	2,250,000	(3)
Firestone	Lake Charles, La.	99,600 LT	16,427,973	6,794,918	7,200,000	11,650,000	(3)
Goodrich-Gulf	Port Neches, Texas	90,000 LT	22,049,192	8,034,950	13,000,000	13,000,000	(3)
Goodyear Synthetic	Akron, Ohio	15,200 LT	7,964,319	3,076,797	1,500,000	2,075,000	(3)
Goodyear Synthetic	Houston, Texas	99,600 LT	15,503,797	5,982,370	8,600,000	11,889,000	(3)
American Synthetic	Louisville, Ky.	44,000 LT	8,982,730	4,970,401	2,340,000	2,340,000	(4)
Shell Chemical	Los Angeles, Calif.	89,000 LT	15,809,998	7,238,195	(1)	(1)	(3)
Phillips Chemical	Borger, Texas	63,000 LT	11,534,086	4,637,707	2,002,000	4,525,000	Cash
U. S. Rubber	Naugatuck, Conn.	22,200 LT	10,403,505	3,328,285	3,200,000	3,200,000	(5)
Texas-U. S. Chemical	Port Neches, Texas	88,000 LT	14,778,074	6,558,312	7,280,000	11,500,000	(3)
Butyl Plants							
Humble Oil	Baytown, Texas	43,000 LT	24,518,422	5,452,105	17,500,000	17,500,000	Cash
Esso Standard	Baton Rouge, La.	47,000 LT	27,977,434	6,416,161	15,274,000	14,857,000	Cash
Petroleum-Butadiene Plants							
Petroleum Chemicals	Lake Charles, La.	63,000 ST	18,702,207	3,511,613	15,125,000	16,000,000	Cash
Copolymer	Baton Rouge, La.	23,000 ST	7,780,541	1,108,308	4,700,000	5,000,000	(2)
Humble Oil	Baytown, Texas	46,000 ST	19,288,496	3,248,449	7,886,000	8,886,000	Cash
{Goodrich-Gulf {Texas-U. S. Chemical	Port Neches, Texas	190,000 ST	59,821,029	10,320,325	51,000,000	53,000,000	(3)
Phillips Chemical	Borger, Texas	74,000 ST	41,585,365	5,919,405	17,018,000	19,100,000	Cash
Food Machinery	Houston, Texas	90,000 ST	31,879,360	6,607,873	11,025,000	24,197,000	(3)
Shell Chemical	Torrance, Calif.	48,000 ST	20,672,471	3,268,073	(1)	(1)	(3)
S. O. of Calif.	El Segundo, Calif.	(6)	7,832,371	715,488	1,500,000	1,500,000	Cash
Alcohol-Butadiene Plant							
Koppers	Kobuta, Penna.	80,000 ST	45,584,297	10,466,580	2,000,000	2,000,000	Cash
Styrene Plant							
Shell Chemical	Los Angeles, Calif.	62,500 ST	15,154,071	3,315,119	(1)	(1)	(3)
Chemical Plant (DDM)							
U. S. Rubber	Naugatuck, Conn.	2,400 ST	383,304	135,860	60,000	60,000	Cash

Notes: †Refers to that portion of capacity the individual plant is required to produce in the event of an emergency. (1) Purchase price of $30,000,000 covered the Los Angeles copolymer plant, the Torrance petroleum-butadiene plant and the Los Angeles styrene plant. Shell's original offer for the three-plant package was $27,000,000. (2) 25% on closing date; 3% 1st year, 3% 2nd year, 7% 3rd year, 8% 4th year, 10% 5th year, 12% 6th year, 14% 7th year, 14% 8th year, 14% 9th year, 15% 10th year. (3) 25% on closing date; balance in 10 equal annual installments. (4) 25% on closing date; 2% 1st year, 2% 2nd year, 2% 3rd year, 8% 4th year, 8% 5th year, 15% 6th year, 15% 7th year, 16% 8th year, 16% 9th year, 16% 10th year. (5) 35% on closing date; balance in 10 equal annual installments. (6) Represents a tandem operation with Los Angeles petroleum-butadiene plant.

thetic rubber made in the government-owned plants unless natural rubber becomes unavailable because of its origin outside of the United States.

Butyl Plant Disposal

The problems facing the Commission with reference to the disposal of the Butyl plants were somewhat different than those involved in the sale of the copolymer plants. The Commission recognized that from the outset, Butyl had been a Standard Oil development. The two Butyl plants owned by the government are presently operated by subsidiaries of the Standard Oil Co. of N. J.—Esso Standard Oil Co. and the Humble Oil & Refining Co. The plants are adjacent to refineries of these two corporations, from which they receive their feedstocks.

Only two proposals were received for these plants, one from each of the present operating companies. The proposals contemplated that the bulk of the Butyl produced would be marketed by the Enjay Corp., another subsidiary. In light of Standard Oil's historical position and present status in Butyl rubber manufacture, the Commission was not surprised that no other proposals were filed.

Limited by the proposals it received, the Commission was faced with the alternatives either of disposing of both plants to Standard Oil or of disposing of only one plant to Standard Oil, having available only half as much end product. In addition, the unsold facility would have to be placed in standby where it would be unavailable for sale for a period of three years.

The Commission, with the approval of the Department of Justice, determined on disposition of both plants. At the insistence of the Attorney General, however, one of the purchasers, Esso Standard, agreed to sell its Butyl plant within three years time, unless some company, not affiliated with Standard Oil, should build a new Butyl plant in the interim.

If another Butyl plant of at least 43,000 long ton capacity is constructed during the three year period, Esso Standard can hold on to its plant.

Facilitating the construction of new Butyl capacity is the fact that Standard Oil has offered to license, under its Butyl rubber patents and technical information, any company desiring to enter this field. Licenses have already been issued to Goodrich-Gulf Chemicals and Petroleum Chemicals, the Commission stated.

The Commission has intimated that Petroleum Chemicals has already expressed interest in the construction of a 46,000 long ton facility for the manufacture of Butyl rubber. The relatively low prices received for the Butyl plants, as shown on the accompanying table, are due to the lack of competitive bidding for these plants, Holman D. Pettibone, chairman of the Disposal Commission, stated.

Butadiene Plant Contracts

Of the eight petroleum-butadiene facilities, five were purchased by the present operators—Copolymer, Humble Oil, Phillips Chemical, Shell Chemical and Standard Oil of Calif. The remaining three facilities went to new owners, in whole or part. The plant at Lake Charles, La., was sold to Petroleum Chemicals, Inc.,

owned equally by Cities Service Co. and the Continental Oil Co.

The plant at Port Neches, Texas, by far the largest of the government properties in this category, was sold to two unaffiliated companies, Goodrich Gulf Chemicals, Inc., and the Texas-U. S. Chemical Co. Food Machinery & Chemical Corp., a newcomer in the synthetic rubber business, was the successful bidder for the plant at Houston, Texas.

The Commission reported that Food Machinery may modify the plant in order to use butane as a feedstock instead of continuing the use of butylenes, upon which the facility is now dependent. To assure a supply of butane, Food Machinery contemplates entering into an agreement with the Tennessee Gas Transmission Co. which, either through its own right or through associated companies, owns or has access to large quantities of butane. Under this arrangement, the supplier of butane would purchase an interest in the facility and enter a long-term contract that would assure a supply of butane for the facility. Food Machinery has received a commitment from Tennessee Gas to take a 50% interest in the plant, according to the Commission.

The report to Congress shows the competition for the butadiene plants, by listing unsuccessful bidders for the facilities:

Plant Location	*Unsuccessful Bidder*
Port Neches	W. R. Grace
Port Neches	Allied Chemical & Dye
Houston	Sinclair Refining
Houston	W. R. Grace
Houston	Allied Chemical & Dye
Houston	Goodrich-Gulf
Houston	Goodyear Synthetic
Baytown	Food Machinery
Lake Charles	Merck & Climax Molybdenum
Torrance	Standard Oil (Calif.)
Torrance	Edwin W. Pauley
Torrance	Dow Chemical

The Commission states that the competitive goals in butadiene disposal are quite different from those to which copolymer plant disposal must be oriented. In the first place, the major present use for butadiene is in the manufacture of GR-S. The only domestic GR-S plants are those to be sold by the government pursuant to the disposal program. Therefore, there exists no host of small consumers requiring a supply of butadiene whose interests must be safeguarded, as in the case with the hundreds of small rubber fabricators. The furtherance of a free competitive butadiene industry requires that the butadiene plants in private hands be able to compete effectively, the Commission states, one with the other, for present and future markets. This goal the commission believes it has achieved.

Plants of Substantial Size

Most of the butadiene plants are substantial in size and comparable in efficiency, and on these bases they are able to compete with each other. There are, of course, certain exceptions to this general statement. On the low side in size, and therefore on the high side in operating costs, are the plants at Baton Rouge and Baytown. Their disadvantages in size and operating efficiency are in a measure reflected in the recommended sales prices for them which are relatively lower than for the larger plants, as will be seen in the accompanying table.

The one alcohol-butadiene plant contracted for, the unit at Kobuta, Penna., has not been operated since July, 1953. The Commission at first doubted that this plant as well as the unit at Louisville, Ky., would be sold. However, a proposal was filed by Koppers Co. which stated that its prime interest was to acquire ownership of the facilities which, pursuant to a lease between the company and the operating agency, now serve adjacent plants owned by Koppers.

The proposed sale to Koppers will result in a cash return to the government of approximately $2,342,000. This figure results from a price of $2,000,000 for the plant, plus an additional figure, estimated to be $342,000, for inventory items on hand at the plant at the time of transfer. As previously stated, the other alcohol-butadiene unit, located in Louisville, has been leased to Publicker Industries.

Styrene Plant Disposal

In contracting to dispose of the styrene plant at Los Angeles, the Commission had to consider more than just the manner and the effect of disposal of that one plant. The Commission states that it became apparent early in negotiations that the disposal of the plant must be related to the larger problem of disposal of the rest of the West Coast complex of plants.

Ten proposals were filed for the styrene plant, proposals which generally presupposed the sale of the West Coast polymer plant as a market for some styrene production. At the same time there were three proposals for the West Coast copolymer plant, including the "package" bid by Shell Chemical amounting to $30,000,000, for the styrene plant, the butadiene plant at Torrance, and the copolymer plant.

Shell Chemical's package price represented the highest aggregate amount offered to the Commission for the three plants. The Commission negotiated with other companies that filed proposals for these plants, and in subsequent negotiations Shell Chemical raised its price. Its package proposal still represents the highest aggregate return to the government for the three plants.

The fact that Shell is not a rubber fabricator, and would thus make the output of the copolymer plant available to the market generally, made this pattern of disposal even more desirable, the Commission stated.

Other Considerations

There is an additional consideration of competition relating solely to the disposal of the styrene plant. The styrene disposal is unique in the disposal program in that the Commission is not selling a monopoly industry. There are, in this country, six privately-owned styrene plants (four of them purchased from the government in 1946-47) which produce styrene for many uses other than the production of GR-S. Two are owned by Dow, and one each by Monsanto, Koppers, Carbide and Carbon, and Foster-Grant.

By its recommended sale to Shell Chemical, the Commission believes that it has contributed to competition in this field. In its signed contract, Shell Chemical specified that copolymer plants are to have first refusal of its styrene production. Any excess production will be sold on terms offered equally to large and small customers.

Other proposals for the styrene plant were filed by the following companies: Dow Chemical, Monsanto Chemical, W. R. Grace, Montrose Chemical, American Chemical, Hercules Powder, National Lead, Foster-Grant, Heyden Chemical, and Standard Oil of California.

Naugatuck DDM Plant

The one remaining plant in the synthetic rubber facilities owned by the government, is the chemical plant operated by U. S. Rubber at Naugatuck, Conn. This plant, the only one of its type in the country, produces dodecyl mercaptan (DDM), used primarily in the production of "hot" GR-S.

As more capacity is converted from the production of hot GR-S to "cold" GR-S, the need for DDM decreases. In addition, another chemical is being privately produced as a substitute for DDM. As it is developed further, this new chemical may actively compete with DDM for the small market it serves, the Commission believes. The contract of sale for this plant to U. S. Rubber contains a commitment by the purchaser to make available, up to 60% of the output of the plant, to small business enterprises and other users.

U. S. Rubber was the sole bidder for the facility. It urged inclusion in this sale of a different national security clause, which would recognize that within less than 10 years there would be no genuine need for this particular product in synthetic rubber manufacture, and consequently no necessity for the standard ten-year clause. The Commission did not accept this position, but believes that future facts as to the necessity for this chemical in the national defense picture might well be reviewed by the government agency administering the clause in the light of conditions that may exist at some future time.

Plastics Consumption Growing

Every man, woman and child in the United States will consume at least 20 pounds of plastics in 1954 as estimated total production reaches the 3,000,000,000 pound mark and adds about $5,000,000,000 in goods and services to the national economy. According to H. K. Intemann, vice-president and general sales manager of the Bakelite Co., only steel, wood and glass will top plastics in volume consumed by 1975, if they continue at their present rates of growth. The plastics industry's average annual rate of growth has been more than four times higher and faster than the average for all U. S. industry in recent years, he stated.

The Disposal Act specifically states that the Akron laboratory should not be sold. The Commission believes that the laboratories' contribution to any post-disposal research program as a testing laboratory and pilot plant must be determined before a decision is reached.

The University of Akron has operated the laboratory since it was built. The Commission believes it has done a very creditable job. The University would like to continue to operate this laboratory, either under contract as it has done in the past or, if the government prefers, it would be willing to acquire the laboratory and operate it as its own. In the latter case, the University has said that it would need to be assured of contracts sufficient to permit operations without loss, as it has no funds which could be used for this purpose.

In this direction, presidents of the "Big Five" have endorsed the University's plan to have the laboratories sold to the school for a "nominal sum." Also, these companies want the government to supply money for at least part of the operating costs if the University gets the facilities.

Disposition of Patents

During World War II, the government entered into a series of patents and related agreements covering synthetic rubber production (butadiene, styrene, GR-S and Butyl) which were designed to ensure that the other signatories (private parties claiming some patent position in these fields) would make available to plant purchasers pertinent patent rights and technical information.

These agreements are of three types: (1) exchange agreements, or other license arrangements, made with private corporations at the inception of the program; (2) the agreements for plant operation, and (3) research agreements with universities, commercial research institutions, government agencies, plant operators and other industrial corporations. The specific patent rights and technical information as well as the terms thus made available vary with each agreement.

Early in its tenure, the Commission turned its attention to these agreements realizing that plant purchasers would seek necessary patents and technical information. The invitation for proposals requested that all proposals contain a statement of the patent and related rights the proposer intended to assert. In addition, the Commission obtained lists of possible relevant patents from many sources. This information was made available to plant purchasers to assist them in deciding what patent rights they might need, and to assist them in the acquisition of such rights.

In addition, in an appendix to each contract of sale, the Commission has agreed that, to the extent of the government's powers under these agreements, it will assist purchasers in obtaining necessary rights. The Commission also agreed in the appendices to make available to purchasers the results of government-financed research in the synthetic rubber field. The patent agreements in which the government was a party and the actions subsequently taken in this field by the Commission assure that adequate rights to patents and technical information are available to plant purchasers, the Commission states.

Justice Department Approval

Under the Disposal Act, the Attorney General of the U. S. was required to submit to the Disposal Commission a statement setting forth his findings approving the proposed disposals in accordance with the standards set forth in the Act, so as to best foster the development of a free competitive synthetic rubber industry.

In statements accompanying the Disposal Commission's report to Congress, the Attorney General reviewed the proposed sales and discussed the conditions leading to the decisions made by the Disposal Commission. Inasmuch as the Disposal Commission had maintained close liaison with the Attorney General throughout contract negotiations, his statements basically underlined Disposal Commission conclusions as to the manner in which monopoly might best be avoided and free enterprise best secured.

Shows Interesting Tables

In his statements, the Attorney General showed two interesting tables, the first of which has to do with the proposed distribution of GR-S copolymer plant capacity, and the other concerning the proposed disposition of butadiene plant capacity. While the factors having to do with the disposition of the GR-S and the petroleum-butadiene plants are discussed elsewhere in this report, the Attorney General's tables serve to amplify statements made earlier. Both tables appear elsewhere on this page.

The Attorney General concluded that on the basis of the information furnished to him by the Commission, he does not view the proposed dispositions as being in violation of the anti-trust laws. He expressed no opinion, however, concerning the legality of any programs or activities in which the proposed purchasers may engage in the utilization of these properties, nor as to any matters other than whether or not the proposed dispositions violate the anti-trust laws.

Security Requirements

The Disposal Act requires of the Commission a determination that disposal of the facilities to the purchasers is consistent with national security. Considering the purchasers and the contracts they have signed, this determination is readily made. All of the purchasers are responsible companies of substantial size. Almost all of them have operated defense plants for the government, either directly or through the medium of subsidiaries, parents, or constituents; most have long records of out-

PROPOSED DISTRIBUTION OF GR-S PLANT CAPACITY

Company	*No. of Plants*	*Annual Capacity (long tons)*	*% of Total Capacity*
Firestone Tire & Rubber Co.	2	129,600	18.8
Goodyear Synthetic Rubber Corp.	2	114,800	16.6
Texas-U. S. Chemical Co.	1	88,000	12.8
U. S. Rubber Co.	1	22,000	3.2
Goodrich-Gulf Chemicals, Inc.	1	90,000	13.1
Shell Chemical Corp.	1	89,000	12.9
Phillips Chemical Co.	1	63,000	9.1
Copolymer Corp.	1	49,000	7.1
American Synthetic Rubber Corp.	1	44,000	6.4
Totals	11	689,600	100.0

PROPOSED DISTRIBUTION OF PETROLEUM-BUTADIENE PLANT CAPACITY

Company	*No. of Plants*	*Assigned Annual Capacity (short tons)*	*% of Total Capacity*
Goodrich-Gulf Chemicals, Inc. Texas-U. S. Chemical Co.	1	190,000	34.6
Food Machinery & Chemical Co.	1	90,000	16.4
Phillips Chemical Co.	1	74,000	13.5
Petroleum Chemicals, Inc.	1	63,000	11.5
Humble Oil & Refining Co.	1	46,000	8.3
Copolymer Corp.	1	23,000	4.2
Shell Chemical Co. Standard Oil of Calif.	1 1 (a)	63,000	11.5
Totals	8	549,000	100.0

Note: (a) The government operates these plants in tandem and the combined capacity is 63,000 short tons. For contract purposes, independent operation was assumed by the Commission and the Shell plant was assigned a capacity of 48,000 short tons and the Standard Oil of Calif. plant 50,000 short tons of equivalent butadiene (crude butadiene and butylenes).

standing operation for the government of the very facilities they have contracted to purchase. The purchasers have also been in the forefront of companies producing major defense items for the government.

National security in rubber has another meaning. It means the assurance of continued operation of the facilities. The economic facts which enabled the Congress to declare, in 1953, that disposal of the facilities is consistent with national security permitted the Commission to make the same determination relative to the purchasers. They can be expected to continue the facilities in operation because it is economically sound to do so; there is wide demand for their product, the Commission says. This being so, all purchasers stated, in the contract, their intention to operate the facilities for the production of synthetic rubber or its component materials. The Commission stated that it has no question of the purchasers' technical competence to operate the facilities.

Additional Safeguard

As an additional safeguard, the statute requires that each contract of sale and instruments in execution thereof shall contain a national security clause which will insure the prompt availability of the facility, or facilities of equivalent capacity, for production of synthetic rubber and its components for a period of ten years from the date of the contract. Pursuant to this statutory mandate, the Commission devoted much time and effort to devising a satisfactory national security clause, and the Commission believes that the clause as written carries out completely the statutory requirements.

In one minor respect the Commission extended the security clause protection beyond that required by the statute. The statute envisions the ten year term of the clause as running from the date of the contract. The contracts were signed in December, but the plants remain in government hands until the time of transfer.

A security clause has no application when the Government is owner; its effectiveness begins when the plants are subject to the control of their purchasers. Therefore, the clause was uniformly written to provide that the ten year term shall commence at the time of transfer. The net effect is to make the clause meaningful throughout its full term.

The clause is included in every contract of sale; it will appear in each deed, and each purchase money mortgage will be made subject to it. In preparing the clause, the Commission had valuable assistance from the Defense Department. The Commission believes all Congressional requirements for national security have been fully met in the sales recommended. Full ten-year protection with regard to synthetic rubber supply in any national emergency has been provided.

To Handle Transitional Supplies

On January 25, one day after the Disposal Commission released its report to Congress, the Federal Facilities Corporation announced its plans to supply all foreseeable demands for GR-S and GR-I without any interruption before or after the transfer of the government-owned plants to private industry.

Under plans announced by FFC, all plants sold will be turned over to the purchasers at transfer date on a full production basis, at which time purchasers have agreed to buy from the government all inventories of finished rubber left in government hands. Inventories, therefore, will be sufficient to permit an uninterrupted flow of rubber from plants to consuming fabricators.

To Accept April Orders

FFC will accept and deliver against purchase orders for GR-S and GR-I up to and including the month of April. This obligation will continue uninterrupted, in the event there is a delay in the disposal program. Starting with the month of May, all consumers of GR-S rubber who order on a 30-day basis and all GR-I consumers should place their orders with prospective private producers of their choice. All GR-S consumers who place orders with FFC on a 90-day basis should continue this practice through delivery months of May-July, in addition to placing duplicate orders with plant purchasers for the same delivery months. If the transfer period terminates April 30, as contemplated, orders placed with FFC will be automatically canceled.

All Federal Facilities Corporation customers will be given a list of plant purchasers who have bought Government inventory of the type such customers use, thus providing them with the opportunity of locating sources of rubber from private industry.

Laurence B. Robbins, Administrator of the FFC, had announced on January 20, that the Corporation will sell approximately 69,000 long tons of GR-S during April, 1955. These sales will be the highest in the history of the Corporation, and are believed to be brought about by (1) current high consumption of over-all new rubber hydrocarbon, and (2) the increased price of natural rubber.

Inventory of GR-S, including oil, held by Federal Facilities Corporation as of December 31, 1954, was approximately 57,000 long tons. All presently operating facilities are being run at full capacity.

The following table sets forth the estimate of FFC production and sales of GR-S for the three months' period ending April, 1955. These figures include the oil content of oil-extended rubbers, but exclude the carbon black used in carbon black masterbatches:

Month	*Production*	*Sales*
February	54,500	58,000
March	61,000	66,000
April	59,400	69,000

Farm Equipment Tires

More than 70 types of farm equipment now use rubber tires, according to a survey made recently by the B. F. Goodrich Co. These tires range in size from wheelbarrow and plow tail wheel tires to the multi-ply type used on large self-propelled combines, each tire being capable of carrying loads of more than three tons. Among the farm implements now equipped with rubber tires as standard equipment are cotton planters and pickers, threshers, hay stackers, and loaders, dusters and sprayers, beet harvesters, potato diggers, discs and harrows, and dozens of others. Goodrich states that it began the manufacture and sale of tubeless tires for some types of farm vehicles in 1950. Because of the low maintenance and long service inherent in tubeless tires it is believed that they may one day become the standard tires on many agricultural implements.

Italian Synthetic Plant Planned

A plant for the production of synthetic rubber from natural gas is in the planning stage at Ravenna, on the Adriatic coast of Northern Italy. Ample raw materials are available in the form of methane, of which 400,000,000 cubic meters would be required each year for the proposed production of 30,000 tons of synthetic rubber and 385,000 tons of nitrogeneous fertilizer. Natural gas deposits at Ravenna are reported to be sufficient for 30 years. Availability of methane gas would make the manufacture of synthetic rubber as much as 30% cheaper than in the United States or Canada, authorities state. The plant will be erected by ENI, the state-owned natural gas corporation, for one of its subsidiaries, ANIC. The projected synthetic rubber capacity is more than twice as large as the likely Italian consumption for the next few years, which means that a substantial portion would be exported.

Voit Adds to Portland Plant

A $600,000 addition, doubling the size of the W. J. Voit Rubber Corp. plant in Portland, Ore., has been started, bringing the company's investment in the plant to $1,400,000 in the last two years. The addition will rise adjacent to the plant built two years ago on one acre of a 5½ acre tract and is to be in operation by August. The plant manufactures camelback. New electric machinery, just purchased, will provide manufacturing facilities entirely new to the rubber industry, officials state.

Rainbow Industries Formed

Rainbow Industries, Inc. has been formed at 600 South Washington Street, Butler, Penna., taking over the operations formerly conducted by Ramar, Inc., at the same address. Rainbow Industries will produce foam coated fabrics. Harry N. Cohn is president of the new concern with Robert S. Cohn as executive vice-president. F. G. Callahan is vice-president in charge of production. Martha L. McCandless has been named secretary of the company, while Richard A. Cohn has been appointed treasurer.

COLLYER SUGGESTS REDUCTION IN NATURAL RUBBER STOCKPILE

Reduction of government expenditures by ending further additions to the national stockpile of crude rubber, at the same time disposing of crude rubber now in stockpile which might be in excess of tonnage required for a national emergency, has been proposed by John L. Collyer, chairman of the board of the B. F. Goodrich Co.

In a letter to Dr. Arthur S. Flemming, Director, Office of Defense Mobilization, the Goodrich executive said that "Calculations made from published, non-classified figures indicate that the United States Government owns, within our country's borders, more than 1,200,000 long tons of crude rubber having an estimated cost of $825,000,000. If so, the government stockpile, plus private stocks in the United States, now total more than 1,300,000 long tons.

"This, coupled with capacities for the production of man-made rubber in the United States would, we believe, take care of our country's military and civilian needs during an all-out war of six to possibly eight years' duration, assuming that the rubber stocks would not be destroyed, or the synthetic rubber plants crippled by enemy, or other action," Mr. Collyer stated. The Goodrich chairman believes that government should answer two questions:

(1) "What is the proper stockpile level in the light of current military knowledge and planning, and considering the advancing state of rubber technology? In this connection, it is our understanding that today the Armed Forces of the United States are adequately equipped with most types of finished rubber products, that pipelines are full, and that additional quantities of some finished products are being stored against future needs.

(2) How can the present stocks be reduced to a lower level in line with real national defense needs without violating the letter and spirit of the international commitments of our State Department relating to governmental management of the crude rubber stockpile?"

Discussing crude rubber requirements in the event of a major war, Mr. Collyer said that in 1948 a special committee from the rubber manufacturing industry made a study for the government of possible crude rubber requirements in the event of a major war. At that time, Mr. Collyer stated, it appeared that if we were to accumulate government and private crude rubber stocks of 800,000 long tons the amount would be adequate for "any foreseeable situation" except destruction of the rubber stocks, or of the facilities for producing man-made rubbers.

Buys Interest in Ultra Chemical

Witco Chemical Co., New York, N. Y., has acquired a half interest in Ultra Chemical Works, Inc., Paterson, N. J., producer of synthetic detergents, waxes and specialties. Ultra Chemical, in addition to a plant in Paterson, also has plants in Joliet, Ill., and Los Angeles, Calif. The transaction was arranged by Shields & Co., New York banking firm.

GENERAL LATEX OHIO SUBSIDIARY SCHEDULED TO BEGIN OPERATIONS

F. H. Mason

R. L. Kelly

J. F. Moroney

General Latex & Chemical Corp. of Cambridge, Mass., has announced that its subsidiary, the General Latex & Chemical Corp. of Ohio, will commence operations during the month of March, 1955. The new plant is located in Ashland, Ohio, and will be a fully-equipped counterpart of the installations at Cambridge, and at Dalton, Ga. Frederick H. Mason, who joined the General Latex staff as a chemist-group leader in 1951, has been appointed general manager of the General Latex & Chemical Corp. of Ohio, and has already assumed his duties in connection with the final fitting out of the new plant. Robert L. Kelly, who has been a member of the Cambridge staff of the company for four years, will assume the duties of control chemist at Ashland. Joseph F. Moroney, who has been factory supervisor at Cambridge, will assume the duties of factory superintendent at the new installation.

General Tire Withdraws Offer

General Tire & Rubber Co. of Akron, Ohio, has withdrawn its offer to acquire control of the Motor Products Corp. of Detroit, Mich., because too few stock tenders were made after both a labor union and the Motor Products' board chairman opposed the offer. General Tire had offered to acquire 315,000 shares of Motor Products, a majority, out of 468,304 outstanding through an exchange of 4½ shares of Motor Products common for one share of General Tire 5½% $100 par cumulative preference stock, or the equivalent of $23.53 a share. The stock exchange was subject to at least 315,000 shares being tendered by January 5, but General Tire could have waived that requirement if it chose. Officials of General Tire have not indicated how much stock was actually tendered.

Plans Thirteenth Annual Meeting

The Division of High-Polymer Physics of the American Physical Society will hold its Thirteenth Meeting at the Lord Baltimore Hotel, Baltimore, Md., on March 17, 18, and 19, 1955, jointly with a meeting of the parent Society. The program, which was arranged by a committee headed by Dr. Thomas DeWitt, Mellon Institute, includes a Symposium on Physical Investigations of Nucleic Acid, as well as papers on other protein polymers, and on the rapid impact behavior of textile polymers. In a recent election, Thomas G. Fox and Robert Simha were elected to three-year terms on the Executive Committee of the Division.

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Wellco Sues Atlas Shoe

Wellco Shoe Corp. and Ro-Search, Inc., Waynesville, N. C., have charged the Atlas Shoe and Sewing Machine Co. of New York, N. Y., with patent infringement and unfair competition. In an action commenced in the U. S. District Court for the Southern District of New York, Wellco and Ro-Search demanded $1,500,000 in damages from Walter J. Slodki, sole proprietor of Atlas. Heinz W. Rollman, president of Wellco Shoe, in announcing institution of the action, declared that his company would not brook infringement of its patent rights and other unfair competitive practices. The complaint in the action charges Atlas with contributing to infringement of the Wellco patents by copying Wellco footwear styles in the advertising and sale of the Antonio Nova vulcanizing presses. The complaint also charges that Atlas is guilty of unfair competition because of deceptive and misleading representations that the presses can make footwear products which are well-known in the shoe trade as unique developments by Wellco and Ro-Search. The complaint demands triple damages, an injunction against future infringements by Atlas, and an accounting for all profits derived as a result of the infringement and unfair competition.

Adhesives Plant Nears Completion

Angiers Co., Cambridge, Mass., has announced that a new subsidiary plant at Huntington, Ind., is nearing completion. Started in mid-summer of 1954, the $120,000 plant is expected to be in operation within a short time in the production of industrial adhesives and cements. The new plant has 16,000 square feet of floor space and will include facilities for the storage and distribution of products produced at Cambridge.

SPI HOLDS FIFTH ANNUAL PLASTICS FILM CONFERENCE IN NEW YORK

The Plastics, Film, Sheeting and Coated Fabrics Division of the Society of the Plastics Industry, Inc., held its Fifth Annual Conference at the Hotel Commodore in New York City on December 7 and 8. The conference featured the presentation of technical, commercial and general papers dealing with subjects of pertinent interest. The two-day session also featured a joint meeting of vinyl film fabricators, processors, and resin producers who discussed industry activities and the constructive steps being undertaken to upgrade vinyl products.

The Program Committee for the conference consisted of James S. Bruskin (Goodyear), chairman, and M. L. Brisco (Goodrich), Paul Lipke (Dow Chemical), Martin G. Caine (Monsanto), Bernard Mittman (Elm Coated Fabrics), David Carnegie, Jr., S. E. Perlberg (Adamson United), Willard deC. Crater (Naugatuck Chemical), J. Roy Price (Bakelite), Kenneth Edgar (Firestone Plastics), Chester Robbins (Interchemical), J. P. Frank (Presto Plastic Products), Fred S. Strauss (Harte & Co.), and Merle E. Wendt (Goodyear).

A number of interesting papers were presented at the conference, including a paper on "Application and Potential of Rigid Vinyl Sheets" by Lee Kuhn of the Firestone Plastics Co., Pottstown, Penna. The purpose of this paper was to briefly describe the composition, methods of production, properties and end uses of several different types of rigid vinyl sheets currently being manufactured in this country.

In the scope of this paper, rigid vinyl sheets were considered to include sheets composed largely of polymers and copolymers of vinyl chloride with such additives as are essential to processing; for example, stabilizers and lubricants, and other additives which are required to furnish specific properties in the finished product, such as color pigments, fillers, plasticizers and other polymeric substances.

Paper on Mixed Plasticizers

Another interesting paper presented at the symposium by L. H. Wartman of the Bakelite Co., Bound Brook, N. J., was entitled "Mixed Plasticizers in Vinyl Chloride Resins". The speaker described a method for predicting certain properties of plasticized vinyl chloride resin compounds which contain more than one plasticizer. The method was shown experimentally to be applicable to brittle temperature, SPI volatility, plasticizer rub-off and nitrocellulose marring. These properties of the mixed plasticizer compound are related in a simple manner to the concentrations of the individual plasticizers and to the value of each of these same properties in compounds of the individual plasticizers.

The speaker stated that in order to obtain the most suitable combination of properties in plasticized vinyl compounds, it is often advantageous to formulate with two or more plasticizers. For example, low temperature plasticizers are often used along with resinous types to obtain a compromise between cold flex and permanence properties. In recent years, Mr. Wartman stated, there has been an increasing tendency in this direction. The ever-present demand for high quality at a reasonable price has necessitated the use of combinations of two and sometimes three plasticizers.

With the great number of plasticizers now commercially available, the speaker pointed out, it is a difficult problem to select suitable combinations for any specific application. Commercial suppliers of plasticizers generally provide property data on their materials in typical vinyl chloride polymer formulations. Naturally, it would be desirable to devise a system whereby these data on compounds of single plasticizers could be used to predict the properties which would be obtained on compounds containing more than one plasticizer. The work reported in this paper, considers this point.

"Growth of Vinyl Plastics in the Wall Covering Field" was the title of the paper presented at the symposium by A. G. Whyte of the U. S. Plywood Corp., New York, N. Y. Mr. Whyte noted that vinyl wall covering has become over the past few years a generic term covering a variety of products with a multitude of end uses not necessarily competitive one to the other. There are a number of relatively different products that fall under this classification: (1) Vinyl coated paper; (2) Vinyl coated cloth; (3) Top printed vinyls; (4) Pigmented vinyls, and (5) Reverse coated and printed vinyl sheeting.

Mr. Whyte observed that the general appearance and characteristics of each of these products can be altered markedly by various finishes and embossings. He reviewed the characteristics of each of the different types of wall coverings and offered some information on recent developments in the field.

In a paper on "Laminating Techniques", Vernon Pierce of Kaykor Industries, division of the Kaye-Tex Manufacturing Co., Yardville, N. J., stated that there are four basic types of laminating methods. He described these as: (1) Laminating of two vinyl films on the plastic calender itself; (2) The process in which the machinery consists of one rubber roll and one steel cylinder, either smooth or embossed. These are pressed together with adjustable pressure by air cylinders. As these rotate, two preheated vinyl films, or one preheated vinyl film and one preheated anchor cloth are fed between the rolls. These two materials will then be bounded together if some basic laminating conditions are met; (3) Press lamination, and (4) Rotocure lamination.

Mr. Pierce emphasized the inherent difficulties of laminating vinyls and discussed why good controls are essential, because: (1) Vinyl chloride is a poor heat conductor; (2) Vinyl chloride will heat degrade; (3) The coefficient of linear expansion is high for polyvinyl chloride, and (4) Vinyl chloride can be surface adhered without complete lamination into one fused mass if the fusing temperature (around 350°F.) is not reached or insufficient pressure is applied so that bridging is not eliminated.

Another of the papers presented at the symposium was entitled "Vinyl Coating: Dispersions vs. Calendering", by deForrest Lott of the Textileather Division, General Tire & Rubber Co., Toledo, Ohio. Mr. Lott compared and evaluated the dispersion and calendering systems in the production of coated fabrics, and discussed the problems inherent in each.

Mr. Lott concluded that if the prime objective to be reached is low cost, high volume production which requires an economic minimum of at least 10,000 yards or pounds per day and film thicknesses in the medium low to high ranges, then there is no question that the calender is by far the superior weapon.

On the other hand, if the objective is to start on a modest scale at a minimum of investment, particularly with film thickness requirements in the lower ranges and likely to remain so, then the obvious choice is a spreader system. This system, however, will be subject to cost fluctuations because of lack of ability to closely control spread.

New Film Forming Materials

In his talk on "New Film Forming Materials", E. J. Koch of the Olin Film Division, Olin Mathieson Chemical Corp., New Haven, Conn., discussed some of the properties desirable in a packaging film. These are: (1) Transparency; (2) Durability; (3) Purity; (4) Package machine runability; (5) Printability, and (6) Low cost. In addition, a good packaging film should, generally, be chemically inert to withstand the effects of acids, alkalis, greases, and solvents. It should be odorless and tasteless and, in addition, non-flammability is desirable.

The speaker stated that polyvinylidene chloride packaging films are at present limited to very special applications because of cost. Rubber hydrochloride, although finding use in a number of applications, particularly meats, is difficult to use on packaging machines. "Mylar" is still young in the packaging field. Because of its high strength it can be used in sufficiently thin gauges to make it a serious competitor in the packaging field. Machine developments are probably necessary, he said.

The vinyls: vinyl chloride, and copolymers of vinyl chloride and vinyl acetate are being used in an increasing number of packaging applications. This particular class of vinyl film is versatile because the properties of vinyl films can be varied over wide ranges by changes in ratio and types of comonomers. The use of different polymer molecular weights and its compatibility with many plasticizers add to its versatility.

Other interesting papers presented at the symposium included:

"How Vinyl Film Quality Standards Can Contribute to Industry Growth", by E. Raymond Corey, Harvard University, Cambridge, Mass.

"Trends in the Use of Woven Saran Fabrics", by Grant W. Cheney, Dow Chemical Co., Midland, Mich.

"Agricultural and Industrial Applications of Vinyl Films and Sheeting", by Eli A. Haddad, Monsanto Chemical Co., Springfield, Mass.

ASTM COMMITTEE D-11 REPORTS ON ACTIVITIES DURING 1954

In a report covering the activities of its committees in 1954, the American Society for Testing Materials indicated that Committee D-11 has completed an extensive revision of the large number of individual specifications for rubber-insulated wire and cable used for the distribution of electrical energy. This included a master specification covering construction details, materials, and voltage test requirements. This general specification is referred to in the individual specifications for specific types of insulation, all of which were brought up to date. Included in this program were two new tentative specifications for polyethylene, and for ozone-resisting Butyl rubber insulation for wire and cable.

In an effort to standarize testing temperatures, Committee D-11 has prepared a tentative recommended practice for standard test temperatures for rubber and rubberlike materials. From this list of standard test temperatures, selection may be made for any specific test or test method. These several recommendations have been approved by the Administrative Committee on Standards.

The first Specifications for Sheet Rubber Packing (D 1313) were issued as tentative. These specifications cover packing or gaskets cut from sheets which are intended for general gasket applications on water, air, and low-pressure steam service lines.

Low Temperature Characteristics

Another new method covers a Test for Evaluating Low-Temperature Characteristics of Rubber and Rubberlike Materials by a Temperature Retraction Procedure (D 1329). This method describes a procedure for rapid evaluation of crystallization effects and for comparing viscoelastic properties of rubber and rubberlike materials at low temperatures. It is useful when employed in conjunction with other low-temperature tests for selection of materials suitable for low-temperature service. It is also of value in connection with research and development, but is not yet considered sufficiently well established for use in purchase specifications, Committee D-11 states.

Important changes were made in the Tentative Methods for Chemical Analysis of Rubber Products (D 297), including a complete revision of the procedures for determining copper and manganese in rubber.

The Tentative Specifications for Non-Metallic Gasket Materials for General Automotive and Aeronautical Purposes (ASTM D 1170; SAE 90R), which are under the jurisdiction of the joint SAE-ASTM Technical Committee on Automotive Rubber, were revised to include four new grades or rubber composition gaskets and three new grades of treated and untreated paper gaskets. In addition, a number of changes were made in specific values for the present grades of materials covered. Several revisions were also made in the SAE-ASTM Specifications for Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Applications (ASTM D 735; SAE 10R).

A noteworthy accomplishment of the year was the preparation of a comprehensive "Glossary of Terms Relating to Rubber and Rubberlike Materials." Suggestions received are now being studied by the originating subcommittee looking toward submission of the glossary to the Society for publication as tentative.

SEVERAL NEW APPOINTMENTS ANNOUNCED BY RAYBESTOS-MANHATTAN

H. H. Burrows

S. R. Zimmerman, Jr.

R. J. Gorecki

Raybestos-Manhattan, Inc., Passaic, N. J., has announced the election of H. H. Burrows as vice-president in charge of rubber sales. Mr. Burrows was formerly sales manager of the Industrial Rubber Products Division at Passaic, N. J. He joined the Manhattan Rubber Division in 1915, and later became manager of the Roll and Tank Department. R. J. Gorecki, factory manager of the Manhattan Rubber Division, has been elected a director of the company. He started with the division in 1926. R. B. Hazard, formerly sales manager of the Packing Division, has been appointed sales manager for rubber and packing. He has been with the company since 1945. S. R. Zimmerman, Jr., formerly assistant general manager of the U. S. Asbestos—Grey-Rock Division, and a director of the company, has been elected a vice-president. Mr. Zimmerman has been with the firm since 1932.

General Tire Promotes Mead

John L. Mead, formerly director of industrial relations for the General Tire & Rubber Co., Akron, Ohio, has been appointed to the newly-created position of director of manufacturing. Associated with General Tire since 1928, Mr. Mead's new duties include general supervision of the company's production activities and industrial relations. A native of Rochester, N. Y., Mr. Mead has served in many executive capacities with General Tire since joining the company direct from the Campus of Antioch College. Mr. Mead had been appointed director of industrial relations in 1947 after serving six years as head of the Methods Department. Previously, he had been production superintendent of the company's Mechanical Goods Division at Wabash, Ind. Mr. Mead is a member of the National Association of Manufacturers and the Manufacturing Committee of the Rubber Manufacturers Association.

American Biltrite Officers

At a recent election held by the American Biltrite Rubber Co., Chelsea, Mass., Miah Marcus was named chairman of the board, while Maurice J. Bernstein was named president. Richard J. Marcus was elected treasurer of the company, and Eliot L. Bernstein, David W. Bernstein and Robert G. Marcus were elected vice-presidents.

Local Arrangements Committee

The Detroit Rubber and Plastic Group, Inc., which will act as host for the Spring Meeting of the Division of Rubber Chemistry, American Chemical Society, which is to be held on May 4 to 6 at the Sheraton-Cadillac Hotel in Detroit, Mich., has announced the appointment of a Local Arrangements Committee for the meeting. J. T. O'Reilly (Ford), chairman of the group, will serve as general chairman, with the following section chairmen: *Banquet,* W. Wiard Dow (Corning); *Finance,* H. Hoerauf (U.S. Rubber); *Housing,* J. Craft; *Ladies Entertainment,* W. Briscoe (U .S. Rubber); *Publicity,* W. Bauer (Brown Rubber); *Plant Trip and Transportation,* G. Hollingsworth (Minnesota Mining); *Program and Meeting Room,* E. Tillitson; *Registration and Information,* E. Kvet, Jr. (Baldwin Rubber). Chairman O'Reilly reports that all plans are progressing smoothly and that preparations are being made to accommodate 800 to 1,000 members and guests.

Colonial Rubber Acquires Plant

Colonial Rubber Works of Logansport, Ind., has purchased a building at Dyersburg, Tenn., and will move its entire operations there in the next few months. The company has acquired and will enlarge the property currently occupied by International Furniture Co., and will be in production by June, officials state. The Colonial plant in Logansport was destroyed by fire last July, and it has been operating on a sub-contract basis through another factory. Colonial manufactures a wide variety of rubber items, including crash and shock pads, gaskets, and rubber products for household appliances. The company ultimately will employ some 300 people, according to W. K. Wickersham, president. The successful location of the new plant concludes several months of negotiations by the Dyersburg Chamber of Commerce.

SIXTH ANNUAL REPORT ON RUBBER ISSUED BY SECRETARY OF COMMERCE

In accordance with the Rubber Act of 1948 and the Defense Production Act of 1950, the Secretary of Commerce has issued the Sixth Annual Report on Rubber, covering the year ended June 30, 1954. The report states that during fiscal 1953, world supplies of new rubber were ample for world requirements, especially toward the end of the period, paving the way to the May 8, 1953 revocation of the rubber control order.

Revocation of the control order gave manufacturers in this country free choice of rubber materials. Their choice under prevailing price conditions was reflected in an increased percentage use of natural rubber, rising from 39% of the total new rubber consumption in May, 1953, to 49% in early 1954.

The higher percentage did not cause an equivalent growth in consumption of natural rubber, because the American total consumption was much reduced after the first half of 1953; consequently, there was a gradual decline in the price of natural rubber to about 20c a pound in March, 1954.

This in turn brought some further curtailment in natural rubber production, and after U. S. rubber consumption showed signs of recovery in March, 1954, and the seriousness of the situation in Southeast Asia was realized, natural rubber prices advanced approaching par with GR-S which sells at a base price of 23c a pound.

GR-S Consumption Declines

The report states that the decline in U. S. rubber consumption and the increased percentage use of natural rubber resulted in a sharp drop in the consumption of GR-S from an average of 57,800 long tons monthly in the second quarter of 1953, to 38,850 in the first quarter of 1954. At the same time, it was desired to operate as many GR-S plant facilities as possible in order to facilitate their disposal as going concerns.

The Reconstruction Finance Corporation found it necessary in October, 1953, to require firm orders to be placed by the larger manufacturers 3 months in advance, to facilitate scheduling of their supplies of butadiene and styrene and their production of GR-S, and to prevent accumulation of government holdings of GR-S in excess of the 85,000 tons maximum prescribed by the Bureau of the Budget. Less drastic reductions took place in the consumption and production of Butyl, and other synthetic rubbers.

The weakness in the price of natural rubber was a matter of continued apprehension to producers and to the governments of rubber producing countries, and this concern was shared by all countries interested in Southeast Asia prosperity as a bulwark against Communism. The previous proposal for an international buffer stock agreement and other proposals were discussed by the Management Committee and representatives of nations party to the International Rubber Study Group at London in October, 1953. Two developments in the U. S. rubber program occurred as a result of these discussions:

(1) The directive issued April 10, 1952, by the Defense Production Administration and announced in the April 21, 1952, revision of the rubber control order, requiring maintenance of minimum consumption of GR-S at an annual rate of 450,000 long tons and Butyl at an annual rate of 60,000 long tons by specifications if necessary, was rescinded November 19, 1953, by the Office of Defense Mobilization. While the consumption of GR-S and Butyl have thus far been maintained above the DPA minimums, the Rubber Act minimums now in effect call for the annual consumption of but 221,667 long tons of synthetic rubber.

(2) The policies and procedures of the General Services Administration in rotation of stockpile rubber, (alleged to have a depressing effect on the prices of low grade rubber), particularly with respect to the rate of upgrading non-stockpile grades and the time allowance for deliveries to GSA of replacements by manufacturers and dealers, were reviewed and amended by new regulations issued by ODM.

The revised program places no limitation on rotation of rubber because of deterioration, but limits upgrading to 5,000 tons a month; forward selling is restricted to the current or three succeeding months; and delivery of replacements must be made to the stockpile in the same month in which the rotation rubber is delivered, except that an additional month is allowed on deliveries from the stockpile in the current or two succeeding months.

The new regulations were published May 4, 1954, prior to the opening of the 11th meeting of the International Rubber Study Group at Colombo, Ceylon. At that meeting, estimates indicated a close balance between expected world production and consumption of rubber during the calendar year 1954 and in absence of a prospective surplus the proposals for a natural rubber buffer stock lacked a basis for support.

Commerce Department Activities

The report then reviews the activities of the Commerce Department during the period under review, touching upon the dissolution of the National Production Authority and the formation of the Business and Defense Services Administration.

It is stated that at the request of the Renegotiation Board, and of suppliers of materials used in the production of synthetic rubber who were involved with the Board on that part of the materials used in defense orders, information on the percentages of GR-S and Butyl used for defense orders was publically released.

It is shown that in 1951, 11.4% of the GR-S consumed went into defense orders and 8.9% of the Butyl used went for the same purpose. In 1952, 9.6% of the GR-S and 8.4% of the Butyl consumed went into defense orders. In 1953, 8.14% of the GR-S and 4.98% of the Butyl rubber consumed went into defense orders.

The report then enters into a discussion of disposal activities, covering the Presidential approval of the Rubber Producing Facilities Disposal Commission of 1953 and the selection of members to serve on the Commission. It also outlines disposal criteria and early Commission activities.

The next portion of the report concerns itself with natural rubber types and price relations. It is stated that at the May 4, 1954, meeting of the International Rubber Study Group at Ceylon, the American delegate urged the need for greater efficiency in the production of natural rubber through replanting obsolete acreage with high-yield trees to reduce future production cost per pound.

Considering the production of GR-S, the report notes that the development of carbon black masterbatches, cold rubber, and oil-extended rubber has meant that the term "GR-S" covers a diversity of materials. The pattern of production is a matter of interest, as well as of particular concern to consumers whose requirements are often specialized, from the standpoint of continuity of supplies after the production facilities become privately owned. The following table covers government GR-S production by chief types in the first half of 1954.

	Long tons	*Percent*
Regular (high temperature)		
Latex	13,944	6.0
Dry	59,823	25.7
Total	73,767	31.7
Cold (low temperature)		
Without oil, GR-S content:		
Latex	9,214	3.9
Dry, with carbon black	18,323	7.9
Dry, not masterbatched	57,901	24.9
Total	85,438	36.7
Containing oil:		
Oil black, GR-S content	8,429	3.6
Oil masterbatch, GR-S content	47,193	20.2
Added oil content *	18,060	7.8
Total	73,682	31.6
Total cold rubber	159,120	68.3
Total GR-S	232,887	100.0

* Counted as rubber starting January, 1952.

The table shows that oil-extended cold rubber accounted for 31.6% of total GR-S production in the first half of 1954. This compares with but 8.2% in the first half of 1952. The growth of popularity of these low-price types of GR-S is another recent factor of competition for the grades of natural rubber mainly produced by smallholders, the report states.

Protective Coat for Whitewalls

White sidewall tires made by the Seiberling Rubber Co., Akron, Ohio, are now being shipped from the factory in transparent protective "coats." The coats are formed from a clear liquid compound which is brushed on the sidewalls to protect them from dirt and grease while the tires are being transported or mounted on rims. As the compound is applied it dries to a tough film which is easily removed with water after the tire is mounted. When the new type material is washed off, it does not streak or discolor the white sidewall like ordinary, colored coatings, according to the company announcement. Seiberling, which developed the new protective coating, is said to be the only company in the industry now using transparent material of this type to keep sidewalls clean.

INDIA ANNOUNCES PLANS FOR RECLAIMED RUBBER FACILITY

According to the January 17th issue of the "Foreign Commerce Weekly", publication of the U. S. Department of Commerce, American investment participation in the form of necessary machinery and possible technical assistance is sought by the Indian Rubber Industries Association, which plans to set up a factory for the production of reclaimed rubber. The plant is to have a capacity of 150 tons per month. The association claims that it has already obtained the tentative approval of the Government of India for this project.

The Association's plans reportedly have not yet been finalized, but it is stated that total estimated capital investment for the project would be 1 million rupees and that the plant itself would cost about 200,000 to 300,000 rupees (1 rupee = US$0.21). Manufacturing will be undertaken by a limited liability company sponsored by the association and restricted largely for capital participation to association members. The association has 90 members representing virtually all the significant manufacturers of rubber products.

There is at present no reclaimed rubber manufacturing plant in India, although some unorganized reclaiming is done by certain factories for their own consumption requirements. Although Indian production of raw rubber has increased in recent years, it has not kept pace with increasing consumption.

Current production of raw rubber in India is about 22,000 tons annually, while consumption in 1954 is estimated at 27,000 tons. The association anticipates that by 1960 consumption of raw rubber will rise to 40,000 tons. Current consumption of reclaimed rubber, all of which is imported, is 1,200 tons.

Because of the shortage of raw rubber and the special qualities of reclaimed rubber for certain manufacturing processes, the association considers it desirable to set up a factory to meet the requirements of its members.

American firms interested in this investment proposal are invited to communicate with the Indian Rubber Industries Association, 7 Homji St., Fort, Bombay, India.

Southern Ohio Group Officers

The Southern Ohio Group has announced the election of the following officers for the 1955 season: *Chairman*, Frank Newton (Dayton Rubber); *Treasurer*, Richard C. Hempelman (Premier Rubber); *Secretary*, Russell J. Hoskin (Inland Mfg.). James R. Wall (Inland Mfg.) has been voted chairman-elect. New directors of the group are Harold R. Bennett (Thresher Paint & Varnish), W. Jay Bolin (American Zinc Sales), and Carl A. Griep (Dayton Rubber). Two-year directors are Herman E. Wening (Inland Mfg.), Robert S. Radow (Dayton Rubber), and Roy A. Marston (Binney & Smith). One-year directors are Dayle R. Buchanan (Inland Mfg.), Frank Newton (Dayton Rubber), and E. L. Stangor (DuPont). Stewart L. Brams (Dayton Chemical Products Laboratories) is ex-officio director.

SUTTON SUCCEEDS RAISTRICK AS HEAD OF BRITISH ANCHOR CHEMICAL

Stanley Raistrick

Eric Sutton

Eric Sutton, associated with the Anchor Chemical Co., Ltd., of Clayton, Manchester, England, since 1939, is taking over the direction of the British Anchor Chemical Corp., New York, N. Y., succeeding the present vice-president and secretary, Stanley Raistrick. British Anchor Chemical is a subsidiary of Anchor Chemical. Mr. Raistrick will return to England at the end of March in order to take a higher executive post with the company. Mr. Sutton served in the Royal Air Force from 1942 to 1946. On his return to the company, he worked as a sales representative. He was appointed assistant sales manager of the company in 1951. During his career, he has been active in the Institution of the Rubber Industry and the Oil and Colour Chemists' Association.

Mr. Raistrick joined Anchor Chemical in 1929, and served in the Domestic Sales Section. After spending some time as a sales representative, Mr. Raistrick was appointed home sales manager. In 1949, he was appointed vice-president and secretary of Anchor Chemical's American liaison office, the British Anchor Chemical Corp. During the next few weeks, Mr. Raistrick will acquaint Mr. Sutton with his duties at the New York office.

Big Mica Strike Reported

What is said to be one of the biggest "strikes" in the recent history of mica mining has been made in the southwestern corner of North Carolina near Cowee township in Macon County which borders on Georgia and South Carolina. The mining operations are under the direction of the Minerals Processing Co. of LaGrange, Ga., operators of the property. Frank Siersma, president of Minerals Processing, stated that outside experts have estimated the property to contain a large tonnage of good quality and valuable block mica. The quality of the mica removed to date has been exceedingly high, the company reports.

Kylon Vinyl Latex Compounds

Polymer Dispersions Co., Staten Island 2, N. Y., has introduced its "200 Series" of vinyl latex compounds. These are high solids latices having a wide range of tensiles and elongations. They are available in clear and a full line of opaque colors. These compounds may be used as coatings for rubber and plastic foams, paper and textiles. They may also be used as dipping compounds and protective and decorative coatings for a wide variety of surfaces.

RMA Revises Type Descriptions

The Rubber Manufacturers Association, Inc., New York, N. Y., has issued a revised edition of "Type Descriptions and Packing Specifications for Natural Rubber". This new booklet replaces and supersedes the previous edition. The changes that have been made are clarifying in nature or in conformance to current trade practices. Most of the changes result from the discussions at the Rubber Quality and Packing Conference held in Singapore in April, 1954. It is anticipated, therefore, that this edition will be accorded even greater acceptance and recognition throughout the world's rubber industry than the original, RMA believes. Copies of the booklet may be obtained from the RMA.

Muscle Shoals In New Plant

The Muscle Shoals Rubber Company has moved into its new building in Sheffield, Alabama. The new plant, considerably larger than the former quarters, is only a block away from the old one. Organized in 1948 by Cowles Horton, Jr., and Everett H. Patterson, the company is rapidly becoming one of the major sources for golf and baseball centers. A number of additional items are also being produced.

SEVERAL INTERESTING PAPERS ON RUBBER HEARD AT SPE ANNUAL MEETING

Several interesting papers on synthetic rubbers and rubber materials were included among the more than fifty papers which featured the 11th Annual Meeting of the Society of Plastics Engineers. The meeting, which was held at the Haddon Hall Hotel in Atlantic City, N. J., from January 19 to 21, attracted a record attendance of approximately 1600 members and guests.

The papers were divided into eight separate symposia and were presented at concurrent sessions. In addition to the technical sessions, the meeting featured an exhibit by the Delaware Valley Reinforced Plastics Council of typical products produced by member companies, an address by Brigadier General C. J. Bondley, Director of Materiel for the Strategic Air Command, at the annual banquet, and the President's Reception and Cocktail Party. Valuable door prizes, including a 14-foot deluxe plastic-fiber glass boat, were distributed to lucky number holders at the banquet.

In a paper on "Reinforcement of Silicone Rubber with Teflon," George S. Irby, Jr., Plastics Department, General Electric Co., Decatur, Ill., stated that of all the new elastomers which have been made available to the product designer in the last ten years, silicone rubber has offered possibly the greatest ultimate potential. The significance of its ultimate properties, however, has often been obscured by deficiencies in the immediate particular stock under investigation.

Early stocks, the speaker stated, had much to be desired. True, they were flexible and rubbery, and remained so over a wide temperature range, but their physical properties were low compared to other synthetic rubbers. Tear resistance was particularly low and this characteristic has been a major deterrent to the use of silicone rubber in many applications. The search for reinforcing agents has been one of the prime objectives of those endeavoring to improve its physical properties.

Reinforcement of Silicone Compounds

Mr. Irby described the reinforcement of silicone rubber compounds with tetrafluoroethylene resin and the chracteristics of the end product. The "Teflon" used in this work was in the form of a granular powder and is commercially available. The end product, marketed under the trade name of "Super Tough Silicone Rubber," exhibits tear strengths three to four times that of regular grades of silicone rubber and improved oil resistance, Mr. Irby stated. The conditions necessary for reinforcement of the elastomer, resulting properties and application were fully discussed.

"Compounding and Processing Copolymer Styrene Resins for the Manufacture of Tough, Rigid Plastics" was the title of a paper presented by R. J. McCutcheon and K. K. Fligor of the Goodyear Tire & Rubber Co., Akron, Ohio. The authors stated that the plastics industry has been relentless in its pursuit of truly high impact thermoplastic resins.

Among those who have done extensive research and development on this project is Goodyear. The development was long and often discouraging, but eventually a good, high impact resin was introduced under the trade name "Plio-Tuf". The authors discussed the properties of this resin, touched upon compounding problems, and gave pertinent data on processing, including mixing, extrusion and molding.

In summary, the authors declared that the high impact and attendent properties of these resins justify the serious consideration of the plastics industry. The high impact resins can be processed and fabricated in existing and conventional equipment. They offer the designer and the industry an opportunity to bridge existing gaps, to meet new fields, and challenge encroaching and competitive industries with confidence.

Irving Katz, Materials Research Iaboratory, North American Aviation, Inc., Downey, Calif., presented a paper on "Recent Advances with Isocyanate-Base Polymers." He stated that three distinct classes of isocyanate-base polymers can be prepared: (1) Polyurethane; (2) Polyureas, and (3) Polyamides. He described these materials and compared their properties.

Isocyanate-Base Elastomers

Mr. Katz noted that in the field of rubber, two new isocyanate-base elastomers are being developed, viz., the isocyanate-modified polyesters and the internally plasticized polyurethane. Isocyanate-modified polyesters demonstrate unusual abrasion resistance, he said. They are manufactured by a three-step process. The first consists of preparing a hydroxy-rich polyester by treating polycarboxylic acids with excess polyhydroxy compounds, the second of lengthening these polyester chain molecules via polyurethane linkages by treating with excess polyisocyanates, and the third of vulcanizing the isocyanate-rich polyurethane-lengthened polyesters by treatment with water, glycol, diamines or even further polyisocyanates.

On the other side of the isocyanate-base rubber program, internally plasticized polyurethanes are being developed as colorless, water white, transparent elastomers having extensibility, toughness, stability to light and heat, insensitivity to water, and good adhesive qualities. The practice consists of taking mixtures of polyhydroxy compounds and hydroxy-rich plasticizers and copolymerizing them with pure isocyanates or isocyanate prepolymers. The reaction occurs at room temperature and is especially rapid at lower plasticizer concentrations. The properties of the subsequent material are enhanced by short postcures, the speaker noted. Standard casting techniques are satisfactory for processing these elastomers.

In other sections of his paper, Mr. Katz discussed adhesives, potting compounds, greases, rocket propellants, expanded plastics, heat-resistant plastics, isocyanate-treated boron-base polymers, isocyanate-treated silicone-base polymers, isocyanate-base catalysts, and future applications of isocyanate-base products.

Another of the papers at the conference was entitled "Engineering Applications of Silicone Rubber" by S. K. Moxness of the Moxness Tool Works, Racine, Wisc. After briefly outlining the general properties and characteristics of silicone rubber, Mr. Moxness presented an interesting series of slides showing a variety of applications. In each case, the speaker discussed the manner in which the silicone rubber was applied; the specific requirement for the silicone rubber part, and how the silicone rubber part filled the bill.

The speaker declared that the limitations placed on applications of silicone rubber due to its low tensile strength and its poor resistance to certain solvents are being eliminated. This is being done through the proper blending of silicone rubber stocks with other new elastomeric materials. Mr. Moxness predicted that a host of applications, hitherto thought impossible for silicones, are just around the corner.

Marblette Increases Sales Facilities

In a program of expanded service to users of plastic materials, improved distribution facilities in the western United States and new sales and storage facilities in Canada have been set up by the Marblette Corp., Long Island City, N. Y., supplier of phenolic resins since 1929 and manufacturer of a line of epoxy resins for plastic tooling, laminating, and other uses. Robert A. Grayson, sales manager of the Marblette Corp., announced that new Marblette representatives are the Acorn Adhesives Co., 678 Clover St., Los Angeles, Calif., and Waldor Enterprises, 3751 Hutchinson St., Montreal. With Marblette materials warehoused in Canada for the first time, Canadian users of epoxy and phenolic resins will now get even faster deliveries than in the past.

May Build Philippine Plant

According to advices from Manilla, the Goodyear Tire & Rubber Co. has expressed interest in the construction of a new manufacturing facility in the Philippines. Previously, Goodrich and Firestone, had announced plans for new plants in the Philippine Islands. At present, Goodyear employs 400 persons on the islands at its different offices in Manilla, Cebu, and its 2,500-acre rubber plantation at Mindanao. Officials state that if the company's plans materialize, the plant would not only fill a vital need in the Philippines' bid for self-sufficiency, but would serve to relieve part of the unemployment.

To Produce Polyester Foams

Cable Makers Australia Pty., Ltd., Liverpool, N.S.W., jointly with S. A. Rubber Mills, Ltd., Adelaide, S. A., have announced that they have been appointed Australian manufacturers of elastic and rigid polyester foams under license from Farbenfabriken Bayer, A. G., of Leverkusen, Germany. The companies state that the manufacture of the foams will begin in March of this year.

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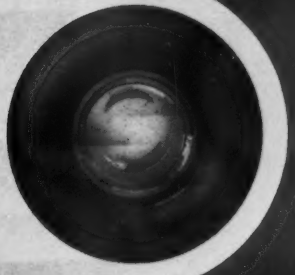

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BATTELLE INSTITUTE INSTALLS NEW GAMMA RADIATION SOURCE

As part of a rapidly expanding program of nuclear energy research for industry, Battelle Memorial Institute, Columbus, Ohio, is installing one of the country's largest gamma radiation sources. It may be particularly useful in activating or "triggering" chemical reactions that are vital to the development of better synthetic chemicals, rubber materials, and new plastics.

Initially, the source will consist of 2,000 curies of cobalt-60, which is equivalent in radioactivity to $24,000,000 worth of radium. G. D. Calkins, in charge of the Institute's radioisotope and radiation research, says the housing for the installation has a planned capacity for 10,000 curies of the powerful atomic energy by-product.

Completely owned by the Columbus, Ohio, independent industrial research laboratory, the initial 2,000 curie cobalt-60 source will be generally available to industry for contract studies about February 15. The new facility offers tremendous opportunities for the development of improved and new products in the chemical processing industries, Mr. Calkins says.

For example, it has been shown that the chlorination of organic materials may be readily initiated by irradiations. The insecticide benzene hexachloride has been produced in the laboratory by irradiating benzene and chlorine with the gamma rays from radioisotopes. Toluene and xylene have also been chlorinated by this means. Chlorinated toluene and xylene are used in making such products as insecticides, perfumes, pharmaceuticals, and dyes.

Radiation Polymerization

Other research has indicated that a wide variety of organic materials may be polymerized with radiation. The polymerization may be conducted at low temperatures and pressures. The conventional plastics such as polyethylene and polystyrene have been made with the aid of radiation. More important, however, is the possibility that entirely new plastics may be produced through radiation-activated reactions. Research on such plastics is currently under way.

Another interesting effect of radiation on organic materials like plastics and rubber is the production of cross linkages between the large chain-like molecules. In the case of rubber, the formation of these cross links is known as vulcanization. This is currently accomplished by the addition of sulfur-containing compounds to the rubber. By irradiating rubber with radiation from radioactive materials, it appears possible to vulcanize rubber without addition of sulfur compounds. The end result of this research may be the development of better rubber materials.

Cross links are also produced when previously polymerized plastics are irradiated, Mr. Calkins states. The physical properties of the plastics are modified in a very interesting manner. In general, the temperature at which they soften is increased markedly and their solubility in organic solvents decreases. In the case of polyethlene, irradiation noticeably enhances its softening point. Irradiated plastics might be used for bottle applications requiring high-temperature sterilization prior to the packaging of a product. Another possible application is plastic pipe used for the transport of organic solvents.

Technical Defense Problems

The National Inventors Council of the U. S. Department of Commerce, in cooperation with the armed services, has compiled a listing of problems currently confronting the scientific and technical personnel in the military groups. It is hoped that the distribution of the list will stimulate the submission of possible solutions to these problems. All correspondence relative to these problems should be addressed to the National Inventors Council, U. S. Department of Commerce, Washington 25, D.C. The current listing contains these problems of interest to the rubber industry:

(1) Windshield rain deflector for aircraft.

(2) Methods for ice removal from aircraft and helicopters that are parked in the open.

(3) Improved methods of de-icing and anti-icing aircraft in flight.

(4) High temperature resistant tires.

(5) Flexible hydraulic connection.

(6) Insulation material.

(7) New oxygen mask material.

(8) High temperature range plastic or elastomer.

(10) Dielectric material.

(11) Elastomer for use in hose, seals, etc., in systems containing synthetic lubricants such as dioctyl sebacate at temperatures as high as 450°F.

(12) Permanent anti-static coating.

Hale & Kullgren Appointments

Wallace H. Woodrow has been named a vice-president by Hale and Kullgren, Inc., Akron, Ohio, consultants to the Rubber and Plastics Industries. Mr. Woodrow joined the company in 1951 as chief engineer. He is in charge of contract engineering work for the company. Mr. Woodrow is a graduate of Purdue University, and was former plant engineer for the Diamond Match Co., and project engineer for Monsanto Chemical Co. In other appointments, Harry E. Tourtilotte was named a project manager. He is a graduate of the University of Maine and has been with the Chemical Division of the Borden Co. as plant engineer and manager. Previously, he had charge of plant maintenance and construction for the Chemical Division of Monsanto Chemical. Robert L. Guggenheim, native of Akron, Ohio, has joined the company and is in charge of Machine Sales. He has been with the Adamson-United Co. on engineering design and sales, and in the Machine Development Division of the Goodyear Tire & Rubber Co. He attended Akron University.

Firestone Stock Split Approved

Stockholders of Firestone Tire & Rubber Co., on January 15, approved a two-for-one stock split, recommended earlier by the board of directors. The action came during the annual stockholders' meeting in the company's offices in Akron, Ohio, during which the nine-man board was re-elected. The stockholders adopted a resolution amending the articles of incorporation to provide that the authorized number of shares of its common stock be changed from 7,000,000 with a par value of $12.50 a share, to 14,000,000 with a par value of $6.25 a share.

FRENCH RUBBER TECHNICAL COMPLEMENTARY MISSION VISITS THE U.S.

As reported in the January, 1955, issue of RUBBER AGE, a second French rubber mission, is now visiting the United States, having started its tour on January 10th. This mission, called the French Rubber Technical Complementary Mission, recently visited New York City and participated in a luncheon meeting with various members of the American rubber industry and other interested parties. Seen above are the members of the French mission, including: Rene C. Aubertin, Edmond A. Barrie, Jean Dutlinger, Antoine Gianni, Jean Labarraque, Paul Lachaud, Michel J. M. Rideau, Paul Rothenburger, and Francois Roullet-Chery. Others present at the luncheon meeting included: H. Gilman, Jr., H. S. McLean, S. Raistrick, M. E. Lerner (RUBBER AGE), R. Seaman, J. B. Barr, Dr. I. Drogin, and an interpreter. The luncheon was sponsored by the United Carbon Co.

DUPONT ANNOUNCES NEW APPOINTMENTS IN RUBBER CHEMICALS DIVISION

Five promotions and new appointments have been announced by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Oliver M. Hayden has been named assistant director of sales, filling the vacancy created recently when Pierre S. du Pont, 3rd, was appointed secretary of the company. H. Herman Abernathy, assistant sales manager (technical), succeeds Mr. Hayden as manager of the division's technical section. Robert F. Harwick, assistant sales development manager, moves from Wilmington to the newly created post of assistant manager of the division's Akron, Ohio, district sales office. Ralph B. Appleby, sales supervisor in Akron, assumes broader duties as special assistant to the manager and assistant manager of the Akron district. Roger N. Conklin, sales correspondent in Wilmington, joins with Ralph S. Graff as technical sales representative in the Wilmington district sales organization.

Have Broad Experience

The five men bring a broad background of experience in the rubber, chemical, and allied fields to their new positions. Mr. Hayden is a native of Windsor, Conn., and was graduated from Clark University in 1914. After a brief time in business and two years in the army, he was employed in the production department of Fisk Rubber Co., Chicopee Falls, Mass., in 1919, and progressed through all manufacturing departments to control and research laboratories. He joined DuPont in 1926 as a compounder in the Rubber Laboratory at Deepwater Point, N. J., and was later promoted to supervisor and then laboratory manager. He was transferred to Wilmington in 1941 as assistant manager of the Rubber Chemicals Division, and in 1949 became manager of the divisions' technical section. During the last half of 1952, he also served the federal government in the Office of Price Stabilization. Mr. Hayden has written numerous papers on rubber technology. He is a member of the American Chemical Society's Division of Rubber Chemistry and has been active in the New York, Boston, Philadelphia, Detroit and Chicago Rubber Groups.

Mr. Abernathy was born in Vidalia, Ga., and received his master of science degree in chemistry from Emory University in 1939, at which time he joined DuPont's Jackson Laboratory staff at Deepwater Point. The following year he transferred to the Rubber Laboratory for research and development work on latex and latex chemicals, becoming latex division head in 1946. From 1952 until his appointment as assistant manager of the technical section in 1953, he had charge of new product development work for the division. He is a member of Phi Beta Kappa, and the American Chemical Society's Division of Rubber Chemistry. Mr. Abernathy has also made a number of contributions to the technical literature on rubber.

Mr. Harwick, a native of Philadelphia and a chemical engineer, was graduated from Drexel Institute of Technology in 1934. The same year, he became an operator for Gulf Refining Co. in Philadelphia, Penna. During the second world war he served as a major with the 506th Parachute Regiment in Europe, and is a veteran of the Normandy invasion and the siege of Bastogne. From 1945 until 1948 he was on the advertising and sales promotion staff of Gulf Oil Corp. in Pittsburgh, and later became west coast editor for "Oil & Gas Journal". Mr. Harwick joined DuPont in 1949 as sales promotion manager in the Petroleum Chemicals Division at Wilmington. Early last year he became assistant regional sales manager of that division for the Gulf Coast area, and was transferred to the Rubber Chemicals Division last September as assistant sales development manager in Wilmington.

Early Experience as Chemist

Mr. Appleby, born in Aurora, Mo., was graduated from Drury College in 1923, and completed graduate studies for a master's degree at the University of Missouri in 1925. Following graduation he was employed by the B. F. Goodrich Co. in Akron as a chemist, later becoming a compounder in the Tire Division. In 1927 he joined the American Cyanamid Co. in rubber technical service and sales work, leaving in 1930 to enter sales promotion activities with the Thermatomic Carbon Co. Returning to American Cyanamid two years later, he served successively as salesman, district manager, and sales supervisor in the Industrial Division. Joining DuPont in 1937, he became a salesman in the Cleveland office of what is now the company's Electrochemicals Department, transferring to the Rubber Chemicals Division and the Akron district office as technical sales representative in 1946. He was appointed sales supervisor in 1951. Mr. Appleby is a member of Alpha Chi Sigma and Gamma Alpha fraternities, as well as of the American Chemical Society, and active in both the Akron and Southern Ohio Rubber Groups.

Mr. Conklin hails from Brooklyn, N. Y., and received his degree in chemical engineering from Rensselaer Polytechnic Institute in 1942. Following two years as a development chemist for the U. S. Rubber Co. at Providence, R. I., he returned to Rensselaer as a chemistry instructor and completed studies for a master's degree in 1947. The same year he joined DuPont as a chemist in the rubber laboratory, where he was engaged in customer service, research and development, new product evaluation, and isocyanates development work. He transferred to Wilmington as sales correspondent and administrative assistant in June of last year. Mr. Conklin is a member of Lambda Chi Alpha, Phi Lambda Upsilon, Sigma Xi, and Kentron scholastic society. He is also active in the ACS Division of Rubber Chemistry.

New Black Packaging Process

Development of a new packing process whereby 65,000 pounds of uncompressed carbon black in the powder form may be shipped in one freight car, increasing the size of consignments and taking advantage of lower freight rates, has been reported by the Witco Chemical Co., and the Continental Carbon Co., New York, N. Y. The process increases by 15,000 pounds the maximum weight of Witcoblak Nos. 50, 32, 55, F-1, F-2, F-3, Witcolith No. 2 and of mixed loadings which may be shipped in a railroad car. Motor truck consignments are increased proportionately. This new process requires no compressing or shaping of bags, therefore the properties of the product are unchanged, it is said. This development represents another pioneering step by Witco-Continental, a leader in modern packaging and handling methods in the carbon black industry. For example, the handling of unit loads on expendable pallets by mechanical equipment, which today is standard in the rubber industry, was first developed by Witco-Continental, it is claimed.

O. M. Hayden

H. H. Abernathy

R. F. Harwick

R. B. Appleby

R. N. Conklin

ONTARIO SECTION HEARS ROWZEE REPORT ON RECENT EASTERN TRIP

The January 13th meeting of the Ontario Rubber Section of the Chemical Institute of Canada, held at the Pickfair Restaurant, Mimico, Toronto, Ont., Canada, heard an address by E. Ralph Rowzee, vice-president and manager of the Polymer Corp., and president of the Chemical Institute of Canada. Mr. Rowzee spoke on "Rubber—Old and New."

The speaker's remarks were divided into two parts, first, comments on the natural rubber industry based on a recent visit to the East, followed by a review of the synthetic rubber industry. Mr. Rowzee prefaced his remarks with some general comments concerning the Chemical Institute of Canada and its relationship with the Ontario Rubber Section.

Mr. Rowzee outlined impressions gained from his trip to the natural rubber producing areas of the Far East in the spring of 1954. With reference to the economy of some of the countries visited, Mr. Rowzee stated that Ceylon is dependent upon the production and sale of rubber, tea and copra, and thus, vulnerable to variations in the world market. The Ceylonese economy has emerged from a difficult period, he stated, and an improvement is expected in the future.

Malaya's economy is based on rubber and tin, and this economy is reasonably sound when rubber sells for 24 to 25c per pound. Indonesian conditions are difficult and reflect the results of independence gained at an early stage in the country's development.

The speaker observed that at the International Rubber Study Group meeting in Ceylon, emphasis was directed to the necessity of replanting the rubber acreage in the East if the production of natural rubber is to be maintained at the present on an increased level. Present consumption of new rubber is at the rate of 2,500,000 tons per year, of which one-third is synthetic. According to recent statistics, that figure is expected to be 3,000,000 to 3,500,000 tons by 1956. Based on supply considerations alone, he said, synthetic is expected to reach 50% of the over-all rubber consumption in three to five years.

Mr. Rowzee then discussed some of the problems facing the Polymer Corp. in the post-war period and the results achieved by the company. The principal synthetic rubbers now in commercial production were discussed and their important uses mentioned. Outstanding developments since the war, namely cold rubber and oil-extended rubber, were also discussed. The effect of tubeless tires on Butyl demand and Polymer's confidence in the future of Butyl as an important synthetic rubber were given considerable attention.

Shifts Comb Manufacture

American Hard Rubber Co., New York, N. Y., has announced that as of February 1, it had shifted the manufacture of combs from its Butler, N. J., plant to its new plant in Booneville, Ark. The Arkansas plant is in its final stages of construction and is designed specifically for the manufacture of combs.

Coming Events in the Rubber Industry

Feb. 18. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Feb. 22-23. Society of the Plastics Industry of Canada, Thirteenth Annual Canadian Conference, Hotel London, London, Ontario.

Mar. 1. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Mar. 18. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Mar. 25. Boston Rubber Group, Spring Meeting, Somerset Hotel, Boston, Mass.

Mar. 31. Southern Ohio Rubber Group, Spring Meeting, Engineer's Club, Dayton, Ohio.

Apr. 1. Akron Rubber Group, Spring Meeting, Mayflower Hotel, Akron, Ohio.

Apr. 1. New York Rubber Group, Spring Meeting, Henry Hudson Hotel, New York, N. Y.

Apr. 6. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Apr. 13-15. Society of the Plastics Industry, Pacific Coast Section Conference, Palm Springs, Calif.

Apr. 14-15. Chemical Institute of Canada, 6th Canadian High Polymer Forum, St. Catherines, Ont., Canada.

Apr. 29. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Apr. 29. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

May 3. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

May 4-6. Division of Rubber Chemistry, A.C.S., Spring Meeting, Sheraton-Cadillac Hotel, Detroit, Mich.

May 7-15. Society of the Plastics Industry, Annual Meeting and Conference, Cruise on "Queen of Bermuda."

June 4. Southern Ohio Rubber Group, Summer Outing.

June 4-5. Los Angeles Rubber Group, Summer Outing.

June 9. New York Rubber Group, Summer Outing, Doerr's Grove, Millburn, N. J.

June 17. Akron Rubber Group, Summer Outing, Firestone Country Club.

June 17. Boston Rubber Group, Summer Outing, Andover Country Club, Andover, Mass.

June 19-23. American Society of Mechanical Engineers, Diamond Jubilee Semi-Annual Meeting, Hotel Statler, Boston, Mass.

June 24. Detroit Rubber and Plastics Group, Annual Golf Outing, Western Golf and Country Club, Detroit, Mich.

June 26-July 1. American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Aug. 19. Philadelphia Rubber Group, Summer Outing, Manufacturers' Country Club, Oreland, Penna.

Sept. 22. Southern Ohio Rubber Group, Fall Meeting, Engineer's Club, Dayton, Ohio.

Oct. 4. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Oct. 7. Detroit Rubber and Plastics Group, Fall Meeting, Detroit Leland Hotel, Detroit, Mich.

Oct. 7. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 14. Boston Rubber Group, Fall Meeting, Somerset Hotel, Boston, Mass.

Nov. 1. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Nov. 2-4. Division of Rubber Chemistry, A.C.S., Fall Meeting, Bellevue-Stratford Hotel, Philadelphia, Penna.

Dec. 9. Detroit Rubber and Plastics Group, Annual Christmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 9. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 10. Southern Ohio Rubber Group, Winter Meeting, Engineer's Club, Dayton, Ohio.

Dec. 16. Boston Rubber Group, Xmas Party, Somerset Hotel, Boston, Mass.

Fleetwood Press, Inc., New York, N. Y., has developed a "flexible" label for use on flexible rubber and plastic containers that "gives" when the bottle is squeezed and returns to its original shape when pressure is released.

Gabriel Williams Co., Inc., Brooklyn, N. Y., is producing a new type detergent scouring pad constructed of cellulose sponge with special synthetic and natural abrasives bound to its scouring surface by Geon vinyl plastic.

ATOMIC ENERGY FINDING USE IN VULCANIZATION OF RUBBER

A new, revolutionary process utilizing atomic energy to vulcanize both natural and synthetic rubber has been developed by the U. S. Air Force, the Defense Department disclosed recently. Perfected by the Air Research and Development Command's Wright Air Development Center, Dayton, Ohio, the new process uses gamma radiation in place of conventional chemical and heat treating methods, Pentagon officials said.

Discovery of the process followed WADC attempts to vulcanize an experimental rubber. When conventional vulcanization methods failed, it was decided to attempt a gamma radiation method, among others. Subsequent investigation of all available natural and synthetic rubber compounds revealed that the gamma radiation technique produced vulcanization equal or superior to that achieved by conventional methods. No residual radiation has been detected in the compounds vulcanized by the gamma method. Using controlled dosages with the various types of materials treated, it has been found that fillers and other additive substances used for compounding purposes impart beneficial properties to the cured elastic material.

In general, the intensity of the gamma radiation, from a cobalt-60 source, governs the degree of vulcanization depending upon the length of exposure and type of rubber. Eliminated in this new process are the heat treating used to achieve vulcanization with conventional methods and the addition of chemical vulcanizing agents, such as sulfur, sulfur derivatives and metallic oxides normally used during the milling process of rubber production.

At present, the new method seems most promising for vulcanizing rubber for specialized uses, such as producing high-temperature oil resistant rubber compounds, and for improving the low temperature-serviceability of rubber.

Supreme Court Rejects Suit

The United States Supreme Court has rejected an attempt by the Georgia Kaolin Co. to collect $1,261,000 from the Federal government because of damage to minerals lands by artillery practice at Camp Wheeler. A ruling of the Fifth Circuit Court of Appeals that the company was entitled to only $22,537 was left standing when the high court refused to hear the company's appeal. The suit involved 845 acres of land containing kaolin that was leased to the Government during World War II and used by Camp Wheeler as an artillery range. The company contended that the land contained the largest known deposits of high quality kaolin and was worth $1,261,000. It sued for that amount. The owners asserted that the land had been made virtually worthless by innumerable shells, many of them containing TNT. They also contended that the Government had breached the contract by failing to restore the land to its original condition.

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Constructing Southern Plant

Scott Testers (Southern) Inc., has announced that a contract has been signed for the erection of a new plant to be located in Spartanburg, S. C. Scott Testers (Southern) Inc., began operations in Spartanburg approximately two years ago as Southern repair and service center for the equipment manufactured by Scott Testers, Inc., Providence, R. I. A stock of parts is maintained, as well as a staff of factory trained service personnel who are also available to travel to users' plants in the South for on-the-spot repairs. The general manager at Spartanburg is John E. Hargreaves. The new building was scheduled for occupation in February of 1955. John Klinck of North Augusta, S. C. continues his established relationship as sales representative for Scott Testers.

Modernizing Research Center

Diamond Alkali Co. is now modernizing and enlarging certain key facilities of its Research Center in Painesville, Ohio, at a cost of approximately $200,000 to meet the expanding needs of the firm's fundamental and applied research programs. The project calls for providing additional space needed to take care of the company's constantly expanding exploratory efforts on new products and processes. The modernization program includes the installation of a new radiation research laboratory for investigating potential applications of atomic energy for chemical applications. The new facilities are expected to be completed and put into full-scale operations in early spring.

General Tire Buys Atkins

General Tire & Rubber Co., Akron, Ohio, has added another member to its growing industrial complex with the acquisition of the Atkins Manufacturing Co. of Toledo, Ohio, a custom perforating firm. Jules D. Lippman, general manager of General Tire's Textileather Division at Toledo, has been named president of the Atkins company. Acquisition of Atkins will expand operations at Textileather. Atkins has developed processes for perforating vinyl, metal, cloth fiber and fiberboard materials. Alex Hunter will continue as vice-president and general manager of Atkins operations. In addition to its perforating business, Atkins also holds a license for the manufacture of perforating machinery. It is expected that this phase of the business will be expanded. Financial details of the purchase have not been disclosed.

Revised Scrap Specifications

The Rubber Reclaimers Association, Inc., has announced revised specifications covering the grading and shipping of the scrap rubber used by Association members' plants throughout the country. Minor revisions are made in the sections covering foreign scrap, packaging and claims. Slight changes have been made in the wording of some grades of scrap tires and tubes so as to make the specifications more uniform and consistent with current practice and conditions. Copies of the specifications, effective January 25, 1955, may be obtained from the Association at 250 West 57th St., New York 19, N. Y.

RETIRED PRESIDENT OF RMA TENDERED TESTIMONIAL DINNER IN NEW YORK

As reported in the December, 1954, issue of RUBBER AGE, A. L. Viles retired as president of the Rubber Manufacturers Association, Inc., as of January 1, 1955. He was succeeded by Ross R. Ormsby, formerly vice-president and general counsel of the association. Friends and associates of the retired president gathered at the Racquet and Tennis Club on January 18 in New York City, to honor him with a testimonial dinner. The photograph above shows the assembled guests at the dinner. *Standing—left to right:* Frank Baldwin (Goodyear); J. L. Collyer (Goodrich); H. E. Humphreys, Jr. (U.S. Rubber); E. A. Callanan (Brown Rubber); C. W. Halligan (RMA); Hugh Bullock (Tyer Rubber); W. J. Sears (RMA); R. R. Ormsby (RMA); A. A. Garthwaite (Lee Rubber); H. E. Smith (Raybestos-Manhattan); J. P. Seiberling (Seiberling Rubber). *Seated—left to right:* L. R. Jackson (Firestone); George Flint (RMA); O. G. Vinnedge (Dryden Rubber); H. G. Smith (U. S. Rubber); William O'Neil (General Tire); A. L. Viles; H. S. Firestone, Jr. (Firestone); A. L. Freedlander (Dayton Rubber); P. W. Litchfield (Goodyear), and G. B. Dryden (Dryden Rubber).

Boyle Elected Vice-President

Earl F. Boyle

Earl F. Boyle has been elected vice-president of the Johns-Manville Corp., and vice-president, general manager and member of the board of directors of Van Cleef Bros., Inc., wholly owned subsidiary of Johns-Manville. Mr. Boyle brings to his new position 38 years of Johns-Manville sales and management experience. He has served as assistant manager in the Packing and Insulation Department in Cleveland, as district sales manager at Detroit, and since 1933 has served as sales manager of Johns-Manville building products in the Chicago district. He assumes his new post with the Van Cleef Division immediately.

Mr. Boyle is well known in the Chicago and the greater middle west area. He is a member of the Board of Trustees of Ohio Northern University and holds a degree of Doctor of Engineering. He is a World War I veteran having graduated from the Heavy Artillery Officers' School, Fort Monroe, Virginia. He is active in Sigma Phi Epsilon, national social fraternity. He is also a member of the North Shore Country Club and the Merchants and Manufacturers' Club of Chicago. The Van Cleef Division of Johns-Manville operates a large plant and general office in Chicago and manufactures electrical insulating tapes, industrial pressure sensitive tapes, rubber and cork composition, molded rubber products, sponge rubber and rubber cements.

Foamed Plastics Study Group

C. H. Alexander (Goodrich Chemical) has been appointed by Professor R. K. Witt, Chairman of Committee D-20 on Plastics of the American Society for Testing Materials, to head a Study Group on Foamed Plastics. This group will survey the interest among producers and consumers of foamed plastics to determine whether or not Committee D-20 should be concerned with test methods and specifications for such materials. Foamed plastics are being used increasingly for such diverse applications as thermal insulation, core materials for sandwich construction, toys, novelties, and advertising displays.

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Rubber Division Spring Meeting

The Division of Rubber Chemistry of the American Chemical Society will hold its Spring meeting in Detroit, Mich., on May 4 through 6. The local chairman is J. T. O'Reilly (Ford). The first technical session will start at 2:00 P.M. on May 4, with John M. Ball (Midwest Rubber Reclaiming), chairman, presiding. This session will be preceded by a regular meeting of the 25-Year Club. The deadline for abstracts of papers to be presented at the meeting is March 8. Abstracts should be of about 200 words, submitted to the secretary in triplicate. In the letter of transmittal accompanying the abstracts the following information should be given: (1) The laboratory in which the work was done; (2) Who will deliver the paper, and (3) How much time is required. If the authors are chemists or chemical engineers resident in the United States, at least one of them must be a member of ACS. (Associate membership in the Rubber Division does not constitute membership in ACS). If a paper is to be presented by authors resident in the United States other than graduate chemists or chemical engineers, evidence must be submitted that the proposed authors are ineligible for membership in ACS. Four copies of the finished paper are to be handed the secretary at the meeting. The secretary of the Rubber Division is A. M. Neal, E. I. du Pont de Nemours & Co., Inc., P.O. Box 406, Wilmington, Del. Nominations for the recipient of the Charles Goodyear Medal will be considered at the Detroit meeting. Any member of the Division is entitled to send nominations to the secretary or to James C. Walton, chairman of the Charles Goodyear Committee, at 455 Glen Road, Weston Br., Boston 93, Mass.

Goodrich to Aid German Firm

B. F. Goodrich Co. has entered into an agreement, approved by the West German Government, to provide technical assistance to Veith-Gummiwerke of Germany, according to an announcement by W. C. Gulick, president, International B. F. Goodrich Co., Akron, Ohio. The Veith company, one of the largest rubber companies in Germany, was founded in 1905 and produces all types of tires and tubes and various industrial rubber products. The industrial group of which Veith is a member is also active in the textiles, machine tool and tannery industries. Following World War II, production in the principal plant of Veith at Hochst im Odenwald (near Frankfurt-on-Main) was resumed in June, 1945, with the assistance of the United States Military Government. The company currently employs over 2,000, has branch offices in the principal cities of the West German Republic, and is engaged in export activities. The future program at Veith provides expansion into tubeless tire manufacturing and the production of other rubber and plastics products involving a sizeable capital expenditure for additional new facilities. International B. F. Goodrich presently furnishes technical assistance to nine foreign associated companies engaged in the manufacture of tires and other rubber products.

McNabb Named to New Post

F. L. McNabb

F. L. McNabb has been appointed manager of sales development of the Hycar and Rubber Chemicals Department of B. F. Goodrich Chemical Co., Cleveland, Ohio. Formerly technical service manager of the department, Mr. McNabb became associated with the B. F. Goodrich Co. in 1935 and has held many technical positions in the general and research chemical laboratories and processing division. He was named sales representative for the industrial and general products division of Goodrich in 1947, and in 1949 moved to Goodrich Chemical as staff representative for marketing rubber chemicals. Mr. McNabb is an alumnus of Kenyon College where he received a B.S. in chemistry in 1933, and of Ohio State University where he was awarded an M.S. in chemistry in 1935. He is active in the Rubber Division of the American Chemical Society.

Cox Named Technical Manager

Alvon R. Cox has been named technical manager of plastisol and bulb products at Plant 4 of the B. F. Goodrich Co. Industrial Products Division. Mr. Cox joined Goodrich in 1938 and was first assigned to the general chemistry laboratories at the company's main plant. In 1939, he became manager of latex foam development at Plant 4. In 1949 he was named manager of the research and development laboratory at American Anode, Inc., now a part of the Goodrich Industrial Products Division. He held this post until his present assignment. Mr. Cox received a B.S. degree in chemistry from Kent State University in 1938. He is a member of the American Chemical Society.

Reclaimers Elect 1955 Officers

Gilbert K. Trimble, president of the Midwest Rubber Reclaiming Co., East St. Louis, Ill., was re-elected president of the Rubber Reclaimers Association, Inc., at the Association's January 25 Annual Meeting. Irving Laurie, general manager, Laurie Rubber Reclaiming Co., East Millstone, N. J., was re-elected vice-president, while Charles T. Jansen (RUBBER AGE) was re-elected secretary-treasurer. F. E. Traflet, vice-president, Pequanoc Rubber Co., Butler, N. J., was appointed chairman of the Association's Executive Committee.

PHILADELPHIA ELECTS OFFICERS; HEARS TWO INTERESTING PAPERS

Approximately 130 members and guests attended the January 14th meeting of the Philadelphia Rubber Group held at the Poor Richard Club in Philadelphia, Penna. The meeting featured an election of officers for 1955 and the presentation of two interesting papers, one by S. W. McCune and the other by O. H. McCollum, both of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc. The following members were elected to office:

Chairman, M. A. Youker (DuPont); *Vice-Chairman,* L. E. White (Walker Bros.); *Secretary-Treasurer,* R. J. Salyerds (Harwick Standard). The following members were elected directors for a one-year term: G. H. Brannan (Binney & Smith), A. J. DiMaggio (Firestone), J. R. Mills (Whitehead Bros.), and A. Lindsay Shaw (Goodrich). The following members were elected for two-year terms: Philip Noble (Cambridge Rubber), and B. A. Wilkes (Godfrey L. Cabot). R. B. Carroll (R. E. Carroll) and H. C. Remsberg (Carlisle Tire) were elected directors for a three-year term.

In his paper on "Applications for Products Made of Hypalon," Mr. McCune stated that Hypalon chlorosulfonated polyethylene contains approximately 27% chlorine and 1.5% sulfur. It is manufactured as a white matted crumb and must be compounded with proper curing ingredients to produce suitable vulcanizates.

In its resistance to deteriorating influences, "Hypalon" is outstanding among elastomers, he stated. It is unaffected by ozone and resists the deteriorating effects of exposure to heat. When properly compounded, "Hypalon" has excellent chemical resistance. Exposure to the weather has little effect on the color or physical properties of "Hypalon" compounds.

These characteristics have resulted in the evaluation of "Hypalon" in a wide variety of products. One of the most interesting of these is the application of "Hypalon" coatings to rubber products in order to provide protection against ozone and to provide an attractive appearance as well. Flexible coatings can be applied to extruded items such as, weatherstripping, window seals, refrigerator door seals. Similar coatings applied to fabric provide chemical resistance, impermeability and weather resistance, which are advantageous in protective clothing and tarpaulins.

Floor tile molded of "Hypalon" compounds has excellent resistance to indentation and wear. Its weather resistance should expand the use of such tile to outdoor installation on porches and sun decks, Mr. McCune said. Hose tubes and tank linings of "Hypalon" are being used in applications involving exposure to oxidizing acids and to chemicals such as, sulfuric and chronic acids, hypochlorite and chlorine dioxide solutions. Conveyor and elevator belt covers are being evaluated where the service involves exposure to high temperatures.

The electrical characteristics of "Hypalon" make it suitable in insulation and jacket compounds in the power distribution field. Blends of "Hypalon" and natural rubber resist ozone attack and are being evaluated in white sidewalls on tires, the speaker concluded.

Mr. McCollum, in his paper on "Processing Characteristics of Hypalon," stated that the material, because of its unusual physical properties, is being used in a wide variety of products, the manufacture of which requires most of the known factory operations. He stated that the processing characteristics of Hypalon are evaluated by comparing the physical properties of the polymer with those of natural rubber, GR-S and neoprene.

Although Hypalon does not "break down" with mechanical treatment, its relatively low viscosity and high thermoplasticity permit rapid mixing and simplify injection molding. Because of these properties, softeners and chemical plasticizers are of minimal importance, he said.

Scorch resistance and curing rate are controlled less readily in Hypalon because of the lack of retarders and limited number of accelerators available. It is expected that continued compounding and processing development will enable rubber manufacturers to use Hypalon efficiently in the production of products having the special features of this new polymer, Mr. McCollum declared.

Rubber Road Advantages

According to the Superintendent of Streets of the City of Chicago, Ill., recent experiments on rubberized pavements in that city have convinced him that this type of paving has four advantages: (1) An elasticity that permits rubber roads to bounce back with no distortion; (2) More adsorption of shock and vibration; (3) A 25% increase in durability, and (4) Greater cohesion of the pavement. The superintendent stated that in the not too distant future, "we can expect an asphalt rubber pavement that resists the formation of ice and also has a preventive against skidding."

New Cratex Rubberized Cones

Cratex Manufacturing Co., San Francisco, Calif., has announced that in order to provide greater convenience and instant and easy operation, Cratex Rubberized Abrasive Cones are now manufactured with threaded steel bushings. The threaded steel bushing, inserted in and bonded to the rubberized abrasive cone, gives a tight union fit and cannot be pulled loose, twisted or turned, once in position, the company states. The improved Cratex Cones with threaded steel bushings are made in two sizes: No. 1358, 1¾ inches long by $\frac{5}{16}$-inch diameter; and No. 1359, 1¼ inches long by ⅜-inch diameter. Both are designed to fit ¼-inch diameter mandrel, and both are made in four grit textures, coarse, medium, fine, and extra fine.

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LOS ANGELES HEARS DROGIN ON SUPER ABRASION BLACKS

The February 1 meeting of the Los Angeles Rubber Group, held at the Statler Hotel in Los Angeles, Calif., heard an address by Dr. I. Drogin, director of research of the United Carbon Co., Charleston, West Va. The title of Dr. Drogin's paper was "On Dispersion of Super Abrasion Carbon Blacks."

The speaker's discussion dealt with methods of overcoming the problem of attaining the maximum values from super abrasion carbon blacks in oil extended GR-S, in natural rubber, and even in cold rubber. Data was shown on the dispersion features of the super abrasion blacks, including two lesser reinforcing types, in these rubbers.

In his talk, Dr. Drogin considered such factors as compound preparation, mixing cycles, stock temperatures, and the reworking of stocks in order to obtain better dispersion. He also presented the results of a study made of various blends of blacks and rubbers and of increased loadings of blacks to attain end products of improved service performance.

Dr. Drogin concluded that the study on the dispersion of super abrasion furnace blacks has indicated better techniques for their formulation and mixing. The blacks have already shown superiority in both cold GR-S and in natural rubber, and have exhibited advantages in oil extended GR-S and in blends of oil-extended GR-S and natural rubber. The full potential strength of super abrasion blacks can be developed, he stated, to provide better service performance with greater economy. Dr. Drogin illustrated his talk with a series of slides.

Reports on A-C Polyethylene

Semet-Solvay Petrochemical Division, Allied Chemical & Dye Corp., New York, N. Y., has announced that successful commercial operations reported by companies coloring polyethylene products indicate that low-molecular-weight "A-C Polyethylene" has performed favorably as a color carrier. Results show that this easier-to-handle material promotes faster dispersion of pigments and provides an economical, practical method of introducing color into film and extrusion types of polyethylene products, it is said. The division has also announced that emulsifiable type A-C Polyethylene is now available in limited quantities for evaluation on plant run scale.

Recent DuPont RCD Publications

The Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has issued a new group of technical publications. BL-272 concerns itself with "Neoprene for Adhesion of Elastomer Coatings to Fabrics," while BL-273 covers "Transparent Vulcanizates from Natural Rubber and Neoprene." "Colors for DuPont Hypalon" is the title of BL-274, and BL-275 is on the subject, "A Processing Aid for Silicone Stocks Reinforced with Valron Estersil." All these technical publications are available from the company.

Reed Announces Retirement

C. A. Reed

C. A. Reed retired January 1 from his position as assistant to the president of Seiberling Rubber Co., Akron, Ohio, after a 40-year career in rubber. He was the third person hired by F. A. Seiberling on November 16, 1921, the day the company was founded. However, he actually began his long association with F. A. Seiberling in 1914, when the latter was president of the Goodyear Tire & Rubber Co. In point of service, Mr. Reed was the oldest Seiberling employee still active with the company. Although retired from active leadership in the company, he will continue to serve as a consultant on sales and policy matters, according to president J. P. Seiberling.

A native of Glenford, Ohio, Mr. Reed was a wholesale specialty salesman travelling out of Chicago before coming to Akron and Goodyear in 1914. He joined Goodyear as a factory foreman, later moving to the sales organization. He was manager of the company's tire repair school and organized and supervised stock clearance departments for Goodyear plants in Akron, Toronto and Los Angeles. At Seiberling, most of his long service was in the sales department. He served successively as manager of service, government, manufacturers, mileage and truck tire sales departments and in 1938 was appointed assistant sales manager. In 1945, Mr. Reed was named assistant to the president, a position he held until 1948 when he became general sales manager. He began his second assignment as assistant to the president March 1, 1953.

Acquires Interest in Two Firms

Norman Eisenstein, president of the Ansbacher-Siegle Corp. and the Federal Color Laboratories, has acquired the business conducted by the A. Bamberger Corp. and its affiliate, the American Molding Powder and Chemical Corp. The Bamberger organization, one of the largest buyers of plastics scrap in the country, deals in and reprocesses plastics scrap and by-products of the plastics industry. Its affiliate manufactures molding compounds that are sold to injection molders and extruders. Both companies maintain headquarters in Brooklyn, N. Y.

Building New Rubber Laboratory

Construction will start immediately on a new rubber sales-service laboratory costing approximately $2,800,000, E. I. du Pont de Nemours & Co., Inc., announced recently. This marks the fourth laboratory for the company's Chestnut Run site near Wilmington, Del., since the property was acquired two years ago. The new laboratory, made necessary by DuPont's expanding business in elastomers and rubber chemicals, is designed exclusively for sales development and technical service of the company's Rubber Chemicals Division. It will enable DuPont to broaden its sales-service activities which for the past 33 years have been conducted at its Rubber Laboratory at Deepwater Point, N. J., one of the oldest industrial laboratories in the rubber chemicals field. It will provide technical service in the application and use of such products as neoprene, "Hypalon" chlorosulfonated polyethylene, rubber chemicals, and "Hylene" organic isocyanates.

Testing and processing facilities will be of the latest type for the liquid and dry rubbers, including complete equipment for milling, calendering, extrusion, and vulcanization. There will be a series of separate laboratory areas for isocyanates, cement, paper, dry polymer processing, latex, physical testing, and consumer product testing. The building, with a total area of approximately 62,000 square feet, will accommodate upwards of 200 laboratory personnel upon completion of construction in the first quarter of 1956. It will be one-story, except for a two-story office section, and of brick and steel frame construction.

Acquires Major Interest In Index

The Pennsylvania Salt Manufacturing Co., Philadelphia, Penna., has acquired a major interest in the Index Chemical Co. of Houston, Texas. Index, said to be first in the United States to produce ethyl and methyl mercaptans synthetically for commercial sale, also produces dimethyl and diethyl sulfides. These organic sulfur compounds are used principally as gas odorants and as intermediates for agricultural chemicals, animal feed supplements, pharmaceuticals and solvents. Index activities will be integrated with the production and sales departments of Sharples Chemicals Inc., a Pennsalt subsidiary and pioneer producer of related synthetic organic sulfur compounds. By combined utilization of Index processes, Sharples' market development and sales organizations, and Pennsalt's Whitemarsh Research staff, the company hopes to realize greater production and distribution of these and similar compounds.

Guide To Better Fatty Acids

The Wilson-Martin Division of Wilson & Co., Philadelphia, Penna., has issued a new edition of its "Guide To Better Fatty Acids", the third published in as many years. Said to be a decided improvement over previously published editions, it carries an unusual amount of information valuable to technical men and users of various types of fatty acids.

Augenstein Joins Rubatex

John G. Augenstein

John G. Augenstein, formerly associated with the U. S. Rubber Reclaiming Co., Buffalo, N. Y., as chief chemist, has joined the Rubatex Division of Great American Industries, Inc., at Bedford, Va., as chief production chemist. A graduate of Mississippi College in 1929 with a B.A. degree in chemistry. Mr. Augenstein pursued graduate studies at Brooklyn Polytechnic Institute. From 1929 to 1932, Mr. Augenstein was a member of the technical staff of Bell Telephone Laboratories, and from 1932 to 1934, he was associated with the Electrolux Sales Corp. In 1934, Mr. Augenstein became associated with the Pequanoc Rubber Co. of Butler, N. J., and at the time he left the company in 1945, he was chief chemist. In that year, Mr. Augenstein joined the U. S. Rubber Reclaiming Co. as chief chemist, a position he held until his most recent appointment. Mr. Augenstein is a member of the American Chemical Society and its Division of Rubber Chemistry. He is also a member of the Akron and Buffalo Rubber Groups and served as chairman of the latter group.

To Represent Carbon Dispersions

F. F. Salamon Co., Box 309, Nyack, N. Y., has been named sales representative for Carbon Dispersions, Inc., of Newark, N. J., and will represent the firm in Connecticut, west of the Connecticut River, the eastern half of New York State and some parts of New Jersey. The Salamon company has also announced that it has concluded its sales arrangements with the Acme-Hardesty Co., in order to concentrate on its activities as a manufacturers' representative.

Atlas Electric Devices Moves

Atlas Electric Devices Co., formerly located at 361 West Superior St., Chicago 10, Ill., has moved to a new and larger plant at 4114 North Ravenswood Avenue, Chicago 13, Ill. The telephone number is EAstgate 7-4520. The company will occupy the entire building at the new address for the manufacture, testing, and research on Fade-Ometers, Weather-Ometers, Launder-Ometers, Atlas Scorch Testers, and the Atlas Accelerator.

Petroleum Chemicals Officers

Officers and directors of the recently organized Petroleum Chemicals, Inc., were announced jointly on January 17 by the Continental Oil Co. and Cities Service Co., both of whom own a 50% interest in the new petrochemical firm. W. Alton Jones (Cities Service) will serve as chairman of the board of Petroleum Chemicals, Inc. L. F. McCollum (Continental Oil) has been elected president. Other officers announced are A. P. Frame, (Cities Service) vice-president; Harold G. Osborn, (Continental Oil) vice-president; B. R. Johnstone, (Cities Service) secretary and treasurer; Keith Blinn, (Continental Oil) assistant secretary; and C. B. Wedum, (Cities Service) assistant secretary. Mr. Jones, Mr. McCollum, Mr. Frame and Mr. Osborn also have been elected to the board of directors. Other directors are E. F. Battson, Chas. A. Perlitz, L. C. Peters and Dr. John E. Kircher (Continental Oil) and B. S. Watson, G. L. Mateer, H. L. O'Brien and W. H. Price (Cities Service). The election of F. M. Simpson as vice-president and general manager of Petroleum Chemicals was announced last fall. Mr. Simpson formerly was president of the Cit-Con Corporation, Lake Charles, La., which operates what is said to be the world's most modern lubricating oil and wax plant, and which is jointly owned by Continental and Cities Service. Petroleum Chemicals, Inc., which is headquartered in New York, recently offered to purchase the government-owned butadiene plant at Lake Charles from the Rubber Facilities Disposal Commission. The Lake Charles butadiene plant has a capacity of 63,000 tons of butadiene annually and employs approximately 400 persons.

Borden Chemical Appointments

William L. Abramowitz has been named a vice-president of the Chemical Division of the Borden Co., New York, N. Y. Mr. Abramowitz had been executive manager of Borden's Polyco Department at Peabody, Mass., known as American Polymer Corp. before the company acquired it in 1953. At the same time, it was announced that the general manager of the Peabody operation will be Dr. Sidney J. Baum, who has been in charge of its Production Department since 1945. Mr. Abramowitz founded American Polymer in 1945, and was a director of the firm until it joined Borden in 1953. He was treasurer of American Monomer from 1950 to 1954. Dr. Baum has been in the chemical engineering field since 1936. Before joining the operation now known as Borden's Polyco Department in 1945, he had been with American Resinous Chemical Corp., the Celanese Corp, of America, E. I. du Pont de Nemours & Co., Inc., and the Newark (N. J.) College of Engineering.

Monsanto Promotes Patterson

P. A. Singleton, managing director of Monsanto Chemicals, Ltd., London, England, has announced the appointment of N. F. Patterson, director and general manager of production, as operations director responsible for all manufacturing operations of the company.

Lee Rubber Plans Stock Split

Directors of the Lee Rubber and Tire Corp. have voted a three-for-one stock split, subject to shareholder approval at the annual meeting on February 24. The split is to be effected by amending the certificate of incorporation and increasing the authorized 325,000 shares of $5 par capital stock to 975,000 shares of the same par value. There are now about 278,398 shares outstanding. The certificate of amendment is to be filed on March 3, which is to be the effective date of the split. New certificates for the additional shares will be mailed on March 15 to holders of record on March 3. Adoption of the amendment will require the affirmative vote of two-thirds of the stockholders. Holders of record on January 17 will be entitled to vote at the annual meeting.

Kontro Company Incorporated

Arne R. Gudheim of Petersham, Mass., has incorporated and affiliated his consulting and process equipment business operated under the name of the Kontro Co., with Artisan Metal Products, Inc. of Waltham, Mass. Laboratory facilities will be maintained in both Petersham and Waltham, and the Kontro Co. will continue to develop and offer unique methods and equipment for the process industries, including the rubber field.

Joins Monsanto-Australia

Dr. E. Barraclough, formerly home sales manager of the General Chemicals Department of Monsanto Chemicals, Ltd., London, England, has been appointed technical director of Monsanto Chemicals (Australia), Ltd. The newly created position will carry no departmental responsibilities the Australian company states. It is designed to assist the work of all sections of the organization and in so doing enable the managing director and other officials to devote an increasing amount of time to the work of progressing the development of the company. Dr. Barraclough was graduated from Manchester University and received his Ph.D. degree from the University of London. He joined Monsanto in 1948 and in 1952 was appointed home sales manager of the General Chemicals Department.

Breathing Vinyl Coated Cloth

A new type of breathing vinyl coated fabric has been introduced by E. I. du Pont de Nemours & Co., Inc. The new vinyl coated material has been made breathable by the use of microscopic pores which are practically inconspicuous and do not break up the continuous surface of this form of "Fabrilite". The material is made of knitted elastic backing which is completely coated even though breathable.

INSTALLATION OF RUBBER RAILROAD CROSSING COMPLETED IN AKRON

What is said to be the first rubber railroad crossing in the world has been installed on the main track of the Erie Railroad at Wilbeth Road in Akron, Ohio, with material supplied by the Goodyear Tire & Rubber Co. The rubber vehicular roadway between the tracks is built with slabs of rubber measuring 36 inches wide by 59 inches long. They are a little more than 3 inches thick, including a sheet of heavy gauge steel sandwiched between each slab. The rubber roadway rests on heavy treated wood planking, called risers, laid on top of each regular railroad tie and each slab is fastened down by lag screws 12 inches long, installed through metal and rubber grommets to hold the slabs securely in place. The rubber slabs are designed with tapered flanges where they meet the rails. When sprung into place, the rubber flanges form a watertight wedge to the rail, thus preventing seepage which causes deterioration of ties and fouls ballast in the crossing. Under normal conditions, the rubber installation should last indefinitely, according to engineers. Smaller rubber slabs were used outside of the rails, extending to the tie ends of the track and these, too, form a watertight union with the rails. The rubber slabs were molded, complete with their metal reinforcing, in Goodyear's St. Marys, Ohio, plant. Special wear and skid-resistant rubber compounds were used. Surface of the rubber roadway is built with a diamond design molded into the rubber slabs similar to the design of the company's "All-Weather" tire tread.

Irvin Speaks on Cycolac

At a recent joint meeting of the Chicago Chapters of the Society of Plastics Engineers and the Society of the Plastics Industry, Howard H. Irvin, chief chemist of the Marbon Chemical Division, Borg-Warner Corp., compared the properties of "Cycolac—a New High Impact Plastic" to those of other rigid thermoplastics on the market. Mr. Irvin discussed evaluation data which the Marbon laboratories have accumulated to date. Mr. Irvin stated that Cycolac has many outstanding physical characteristics which make it a worthwhile addition to the plastic materials market. The product has the lowest gravity of any of the rigid thermoplastics on the market, he said, and its strength ratio is exceeded only by nylon. Cycolac maintains its good impact strength even at very low temperatures and has a brittle point below —45°C. It also has outstanding electrical properties, Mr. Irvin declared. Processing characteristics of Cycolac are excellent; it is completely free of shrinkage which makes it a very suitable material for calendering. As far as is known, Mr. Irvin noted, Cycolac is the only high impact injection molding material which will not only give high surface hardness, but also excellent gloss. Because of its high tensile strength and proportionately great burst strength, it is felt that the material will prove to be ideal for extrusion into plastic pipe, particularly large sizes. Cycolac has an extremely low co-efficient of friction and appears to show promise for use as a bearing material, the speaker stated.

DuPont Organic Isocyanates

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the development of two organic isocyanates, "Hylene M" and "Hylene M-50". Hylene M is described as a chemical bonding agent which, when added to elastomeric cements, will improve adhesion. In chemical composition it is 92 to 95% methylene bis (4 phenyl isocyanate). A dark brown oily liquid, it has a specific gravity of 1.23. Hylene M-50 is Hylene M in solution. Hylene M-50 is said to be more easily incorporated into elastomeric cements than Hylene M and the resulting material is more stable. In chemical composition it is a 50% methylene bis (4 phenyl isocyanate) and 50% ortho-dichlorobenzene. It has a specific gravity of 1.24 and is also a dark brown liquid in appearance.

Introduces New Foam Mattress

U. S. Rubber Co., New York, N. Y. is extending its line of foam mattresses by introducing, for immediate delivery, a promotional foam mattress with matching foundation that will retail for a new low price. The foam mattress, which is 4½ inches thick, is full length, full width and full height. It will be stocked in branches throughout the country and will carry the U. S. Rubber Co. label. The quality woven stripe ticking will be permanently anchored to the mattress. The mattress will be packed individually in cartons. This addition rounds out U. S. Rubber's foam mattress line which includes Koylon Gold Label units.

Appointed General Manager

Norman J. Johnson

Norman J. Johnson has been appointed general manager of Griffith Rubber Mills effective January 1, according to an announcement by Zina A. Wise, president of the Portland, Ore., firm. Mr. Johnson has been with the organization for over 12 years and has served as assistant to the president for the past year. He was assistant treasurer from 1947 to 1951 when he was made treasurer and assistant general manager of the firm. Other personnel changes include the appointment of Douglas Jones to take charge of the firm's foreign export business, and Zan Wise to handle the sales activities of the Griffith marine specialty line of products which the company manufactures. Mr. Jones was born in England and has spent much of his life in foreign countries. For several years he was manager of an American Firm in Shanghai, China. During World War II he was interned in Shanghai. In 1951 he went to Puerto Rico and only recently arrived in Portland. Since 1911, Griffith Rubber Mills has been manufacturing industrial rubber products for paper mills and other Northwest industries. In addition, the company manufactures numerous rubber specialty items.

New Polyvinyl Chloride Resin

Designed specifically to meet steadily increasing demands of plastic processors and fabricators for a resin that can be processed at temperatures of from 315°F. to 330°F., a new polyvinyl chloride resin has been announced by the Plastics Division of the Diamond Alkali Co., Cleveland, Ohio. Similar in characteristics to "Diamond PVC-50", first introduced by the company in 1953, the newly-developed resin has a lower specific viscosity than the former material, with a correspondingly lower molecular weight. It is not intended to replace Diamond PVC-50, but to supplement it. The new polymer, "Diamond PVC-45", is also said to have high bulk density, excellent heat stability, color retention, dry-blending and free-flowing properties required in materials of this type used in producing vinyl sheeting and film, non-electrical extrusions, and molded products. Diamond PVC-45 is now being produced in the company's Deer Park Plant at Houston, Texas.

Rubatex Gai-Foam in Production

A new vinyl foam material said to possess all the fine qualities of foam cushioning plus important physical advantages has passed extensive laboratory research and production run tests and is now in full production at the Rubatex Division of Great American Industries, Inc., Bedford, Va. Trade-named "Rubatex Gai-Foam", it is manufactured under the Elastomer Process. Because Rubatex uses a gas absorption process in producing its new vinyl foam product, the plastisol compounds used are considerably less expensive, the company states. Rapid curing by radio high frequency equipment also reduces production time. Outstanding features of the new vinyl foam are said to be: (1) resistance to tearing, aging and abrasion; (2) greater tensile strength; (3) fine texture and excellent uniformity of cell structure throughout; (4) outstanding flame resistance; (5) better compression characteristics; (6) does not oxidize, harden or dry out, and remains practically odorless; (7) no stain or discoloration from contact with rubber chemicals; (8) when used as cushioning, it cements easily to plastic fabric covers, and (9) unlimited adaptability to heat sealing applications. Gai-Foam is now being produced in white flat utility stocks. According to the company, the material will soon be marketed in choice of color and in slab utility, crowned utility, and molded cushions.

Goodrich Express Truck Tire

A new low-cost highway truck tire, the "Express", has been announced by the B. F. Goodrich Co. Tire & Equipment Division. The new tire is designed to meet the needs of thousands of city delivery truck operators and small fleet operators who need a good quality tire at low cost, the company states. The new tire is available in 18 sizes and ply ratings, ranging from 7.00-15 6-ply to 10.00-22 12 ply. The Express is expected to be especially popular with large, over-the-road haulers who need a low-priced tire for trailer wheels, according to J. E. Powers, manager of truck tire sales. Tread design of the new Goodrich Express has the conventional five-rib design of the type used on the majority of truck tires today. The Express will deliver maximum mileage at low cost while affording excellent traction and skid resistance, Goodrich claims.

Establishes Safety Record

Over 2,000,000 man hours without a lost time accident is the record held by B. F. Goodrich Chemical Company's Louisville, Ky., installation, according to J. L. Nelson, plant manager. The last disabling injury occurred on September 3, 1953, said Mr. Nelson. Since this time, over 15 months ago, some 2,200,000 man hours have been worked without a lost time accident at the large plastic and rubber making plant of Goodrich Chemical. Mr. Nelson said that contrary to popular belief, the chemical field ranks among the top 9 industries of the country in safety. Goodrich Chemicals' Louisville plant produces Geon vinyl resins and Hycar.

Linde W-96 Silicone Gum

A new type of silicone rubber, said to offer important features never before available, has been announced by the Silicones Department of the Linde Air Products Co., New York, N. Y. This silicone is available in production quantities as gum stock, called "W-96 Silicone Gum". The secret of the unique properties of the new product, according to Linde, is that a controlled number of reactive groups have been built into each silicone molecule. These reactive groups determine the final structure of the cured rubber. It is this "controlled reactivity" that gives advantages in curing the rubber, as well as special properties in the cured product. As far as can be determined, the company states, this new gum will do all that previously known methyl silicone gums and their compounds can do, but at the same time possesses many striking advantages, with possibly more to be discovered. The controlled reactivity of W-96, inherent in the gum stock itself, makes unnecessary any special compounding and curing techniques. Tabulation of typical post cure properties of W-96, compounded to three different hardnesses, points up the superior combination of properties obtainable:

Hardness (Shore A).....	40	60	80
Tensile (lbs. per sq. in.).....	900	850	800
Elongation (% at break).....	350	250	170
Compression Set (% original deflection Method B, 22 hrs. at 350°F.)	12	15	20

In comparing these data with those given for other silicone rubbers, it should be noted that these compression-set tests were run at 350°F., as called for in the Aeronautical Materials Specifications. One feature of W-96 that should prove most interesting to rubber fabricators, Linde states, is that this new material can be filled with a variety of carbon blacks. Such compounds are readily cured, because of the controlled reactivity of the gum stock. The carbon black filled rubbers exhibit properties similar to those made with conventional silica fillers.

Transfers Hystrene Marketing

Effective February 1, 1955, the marketing of "Hystrene" fatty acids will be transferred from the Atlas Powder Co., Wilmington, Del., to the HumKo Co. of Memphis, Tenn. Atlas for the past five years has been sole sales agent for the Hystrene line, which is manufactured by HumKo's Trendex Division. Simultaneously, it was announced that George W. Collins, in charge of Hystrene sales at Atlas, has joined the HumKo staff to head up their fatty acid sales program. Atlas presently is completing an emulsifier plant adjacent to the HumKo plant in Memphis. Agreements have been made whereby HumKo will supply raw materials for this Atlas operation and in turn will be one of the new plant's major customers. Mr. Collins had been with Atlas since 1947, serving first in the Chemicals Department sales division and later as product manager in charge of Hystrene sales program. A native of Wilmington, Del., he holds a chemical engineering degree from Worcester Polytechnic Institute.

Air Conditioned Tubeless Tire

Seiberling Rubber Co., Akron, Ohio, has introduced an "air conditioned" tubeless tire which features a new type, silent tread design and a specially compounded inner liner. The premium, nylon white sidewall tire is "air conditioned" by Seiberling-patented heat vents—small cylindrical openings which extend into the shoulder area of the tire. These vents "breathe out" excess heat when the tires are in use, thus reducing heat build up which is a major cause of tire failure. The tire's new tread design uses "Y" shaped stop-slots for improved traction and round "silencer" blocks are built into the outer tread grooves. This design not only improves traction but also reduces noise and "squealing" on turns because the silencer blocks prevent excessive tread vibration which causes tires to squeal, Seiberling said. Tests conducted for several years show that the special-type leakproof inner liner reduces danger of sudden blowouts and prevents air from seeping into the tire body or escaping around the beads. The company has applied for a patent on the Seiberling-developed inner liner, which "seals" air inside the tire without use of an inner tube. Known as the "T-190," the tire has been streamlined in appearance by moving the scuff bar closer to the tire shoulder, thus giving a wider sidewall. Seiberling produces the T-190 in a full range of sizes.

Convertible Car Top Material

Textileather Division of the General Tire & Rubber Co., Toledo, Ohio, has developed a new convertible car top material made of a tough vinyl coating supported by a specially woven textile base. Called "Duratop", the material is strong and durable and is said to resist fading, shrinkage, leaking, staining, cracking, scuffing and rotting. Duratop is manufactured in navy blue, white, tan, green, black with black fabric base, and black with tan fabric base. The color is impregnated in the vinyl coating. One car manufacturer is currently using Duratop as original equipment on a 1955 model convertible.

Custom Plastics Casting Service

Applied Engineering Associates, Brooklyn, N. Y., has announced it will custom cast multi-component resin mixes such as ethoxylenes, polysulfides, polyamides, foamed phenolics and polyurethanes to produce end products at its plant. This new service will enable the materials engineer, product designer and sales department of any organization to determine utility and customer acceptance of their contemplated end products as Applied Engineering Associates will produce the finished product under production conditions, it is said. This new service will be analogous to metal foundry shop operations for preparation of castings. Applied Engineering Associates will produce finished parts to detailed specifications by its modified injection molding technique utilizing inexpensive or expendable molds. Production costs analyses can be projected accurately.

Portable facilities are planned for handling foamed phenolics and polyurethanes at the customer's plant to include such applications as buoyancy chambers, thermal and acoustical insulation for boat hulls as well as core filler for structural sandwich construction. The advantages of foamed-in-place materials will be utilized on a commercial basis for the first time for many applications. Applied Engineering Associates has made castings for many end products, including electronic embedments, impellers and housing, piping fittings, disc pistons for meters, components for impact tools, various types of gaskets, metal forming dies, etc. Pilot and production run facilities are also available to assist organizations in planning their own manufacturing facilities.

Reports on Industry Earnings

Rubber industry wages and salaries hold a respectable edge over other manufacturing pay, and the tire and tube lines are even further ahead, according to the 1954 Statistical Abstract of the U. S., published by the Census Bureau. Covering 1953, the publication shows that weekly earnings averaged $77.78 for all types of rubber products and $88.31 for tire and tube manufacturers. The average weekly earnings in manufacturing as a whole were $71.69. The figures show that since 1951 when average weekly earnings in the tire and tube segment of the rubber industry were $78.01, earnings in tires and tubes had risen more than $10 a week. The gain was nearly as great for all rubber manufacturing, which averaged $68.61 in 1951. The rubber industry earnings chart shows weekly hours dropped a fraction from 40.6 in 1951 to 40.3 in 1953, while average hourly earnings rose from $1.69 to $1.93 in 1953.

Polyurethane Foam Shoulder Pads

Curvex Shoulder Pad Co., Los Angeles, Calif., reports that it is now producing shoulder pads from polyurethane foam. The pads are claimed to be washable, drycleanable, light in weight and crush-proof. Curvex is now producing these pads at the rate of 50,000 a week. The firm is also building equipment calculated to increase its capacity to 250,000 a week.

NAMES IN THE NEWS

DR. KENNETH W. SCOTT has been appointed to the Physics and Electronics Section of the Research Division, Goodyear Tire & Rubber Co., Akron, Ohio.

ROBERT P. BEASLEY, associated with the Firestone Tire & Rubber Co. since 1937, has been elected assistant comptroller of the company.

SOL FURST, president of the Circle Wire & Cable Corp., has been elected a trustee of Yeshiva University, New York, N. Y.

DR. WALDO L. SEMON, director of pioneering research for the B. F. Goodrich Co., has been named to the Metropolitan Park Board of Akron, Ohio, to fill the last two years of the unexpired term of the late DR. H. E. SIMMONS.

DR. ALVAN H. TENNEY, who first joined the Carbide and Carbon Chemicals Co. in 1933, has been appointed manager of market research, for the company.

FREDERICK K. LACHER, secretary of the National Rubber Machinery Co., has been elected a director succeeding G. ROY BILGER, who has resigned.

ROBERT B. WILSON, with twelve years' experience in the mechanical rubber field, has been appointed a sales engineer for the Minnesota Rubber and Gasket Co.

COLLIER W. BAIRD, JR., formerly secretary of the Baird Rubber and Trading Co., has been elected vice-president. HELEN L. DANTON has been named to succeed Mr. Baird as secretary.

GORDON R. PORTERFIELD has joined the Elmes Engineering Division of American Steel Foundries as district representative in the New York territory.

D. HASKELL SMITH, formerly associated with the Keystone Mounts Corp. at Buffalo, N. Y., has joined the Southeastern Rubber Products Corp., Birmingham, Ala., as chief chemist and technical director.

DONALD J. BUCKLEY, associated with the Standard Oil Development Co. since 1942, has been appointed a Section Head in the company's Chemical Research Division.

WILLIAM M. GASTON, associated with the B. F. Goodrich Co. since 1926, has been named manager of the New York office of the International B. F. Goodrich Co.

J. B. WILLIS, formerly assistant to the vice-president in charge of research for the Sinclair Refining Co., has been appointed chief process engineer of Sinclair Chemicals, Inc.

PETER W. WALKINSHAW, formerly associated with the Carbide and Carbon Chemicals Co., has joined National Polychemicals, Inc., Wilmington, Mass., as plant superintendent.

WALTER M. OTTO, technical manager, Synthetic Rubber Division, Firestone Tire & Rubber Co., has been elected chairman of the Akron Section of the American Institute of Chemical Engineers.

ROBERT R. MELTZ, formerly associated with the Moreland Corp., has joined the Vulcanized Rubber and Plastics Co. at Morrisville, Penna.

PAUL M. DESCHRYVER, associated with the U. S. Rubber Co. since 1938, has been named manager of the Sales Control Department, Mechanical Goods Division.

J. E. MAYL, vice-president and general manager of the Films, Foam and Flooring Division of the Goodyear Tire & Rubber Co., was recently honored by the company on his completion of 30 years' service.

Elected Goodrich-Gulf President

William I. Burt, vice-president-manufacturing of B. F. Goodrich Chemical Co., has been elected president of Goodrich-Gulf Chemicals, Inc., a company owned half by the B. F. Goodrich Co. and half by the Gulf Oil Corp. He succeeds William S. Richardson, president of the B. F. Goodrich Co., who was elected president of Goodrich-Gulf Chemicals when the jointly-owned organization was established in November, 1952. Mr. Richardson will continue to be a member of the board of directors of Goodrich-Gulf Chemicals. With Goodrich since 1927, Mr. Burt became vice-president — manufacturing of the B. F. Goodrich Chemical Co., a division of B. F. Goodrich, in 1945. He was educated at Ohio State University, graduating with a degree in chemical engineering. He had been manager of the company's chemical plant in Akron, Ohio, general manager of plants, and superintendent of the Chemical Division before assuming his position of vice-president-manufacturing of Goodrich Chemical. In 1952, Mr. Burt was president of the American Institute of Chemical Engineers of which he had been a director for six years.

Goodrich-Gulf Chemicals, on December 17th, announced that it has made an acceptable bid to the Rubber Producing Facilities Disposal Commission to purchase an undivided half interest in the government-owned butadiene plant at Port Neches, Texas, as well as a copolymer plant in the area. If these properties are acquired the company will begin making synthetic rubber of a type used in automobile tires and other principal rubber products.

Lester Bigelow Retires

Lester D. Bigelow

Lester D. Bigelow, 65, a vice-president of Hewitt-Robins Inc., and sales manager of the company's Rubber and Conveyors Divisions in the Central and South Central Sales Regions, has retired. He had been with Hewitt-Robins since September 1, 1932, and had been in the rubber business for more than 50 years. In preparation for his retirement, Mr. Bigelow earlier this year appointed L. C. Holloman as sales manager of the Central Sales Region with headquarters in Chicago, and J. W. Pew, sales manager of the South Central Sales Region with headquarters in Houston. Mr. Bigelow started his career in 1904 as an office boy for the Mechanical Rubber Co., Chicago, Ill. He also worked for the New York Rubber Corp., Beacon, N. Y., before coming to Hewitt-Robins as assistant to the vice-president and general manager at Buffalo, N. Y. He was appointed sales manager of the Central Division in March, 1933. During World War II, Mr. Bigelow operated the company's Buffalo plants which specialized in industrial rubber products and self-sealing fuel cells. He was president of the Masonic Standard Club, Chicago, from 1931 to 1932, and is a member of the Masonic Blue Lodge as well as the Oriental Shrine and the Chicago Athletic Association. An ardent sports enthusiast, Mr. Bigelow played semi-pro baseball with the Chicago Standards during 1909 and 1910.

Phthalate Plasticizer Blends

Pittsburgh Coke & Chemical Co., Pittsburgh, Penna., has developed a new series of phthalate plasticizer blends designed to reduce plasticizer costs without sacrificing quality. The new blends were developed by the company as a part of its continuing program to provide the industry with better plasticizers at lower cost. One of the new series of formulations developed by the company is a blend of Pittsburgh PX-114 (decyl butyl phthalate) and Pittsburgh PX-118 (isooctyl decyl phthalate). Duncan MacLennan, sales manager of the company's Plasticizer Division, said that this new blend compares very favorably with DOP in every important respect and can replace DOP in a wide range of applications.

Hooker-Durez Merger Planned

Officers of Hooker Electrochemical Co., Niagara Falls, N. Y., and Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y., announced on January 13, 1955 that they are negotiating for a merger of Durez into Hooker by the issuance of one share of Hooker for each share of Durez. In anticipation of this, directors of Durez have declared a 10% stock dividend. The North Tonawanda company is expected to be operated as a division of Hooker, and will retain the Durez name. In the opinion of the two managements, the merger will result in a stronger company with a broader base of operations, manufacturing a more diversified line of products, and the combination will result in a stronger research organization. The issuance of 1,650,000 shares of Hooker's stock to Durez stockholders will bring total issued shares of Hooker common stock to over 5,000,000 with a wider ownership and better marketability. It is anticipated that the merger will increase Hooker's sales by approximately 50%. The close proximity of the main plants and offices of the two companies will be an advantage. It is expected that substantial savings can be made in general administration and operation.

The main advantage to Hooker is from the standpoint of developing a basic position in the important growing plastics and resins industry. It will also tie-in with Hooker's new "Hetron" polyester resin, and management believes it will lead to the manufacture of other plastics and resins in the future. Durez has been rated as one of the nation's largest manufacturers of phenolic resins and plastic molding compounds, and it manufactures its own basic chemical raw materials, phenol and formaldehyde. Hooker, celebrating its fiftieth anniversary this year, manufactures over 100 basic and processed chemicals at its three plants located in Niagara Falls, Montague, Mich., and Tacoma, Wash. Durez was established in 1922 and has plants at North Tonawanda, N. Y., Kenton, Ohio, and Spokane, Wash.

Monsanto to Supply Adipic Acid

Monsanto Chemical Co., has come into the market as a major supplier of adipic acid. It was announced that this important resin intermediate is available in commercial quantities from its Organic Chemicals Division. Adipic acid, which has long been a raw material for nylon, is used to modify surface coating resins, imparting flexibility to the films, and to improve the flexibility of polyester resins. The number of applications for this chemical is steadily increasing. Newest and most promising use of adipic acid is in the manufacture of flexible isocyanate-foamed polyester resins. These are growing in popularity as padding, sponges and upholstery materials. This reactive dibasic acid is also used in the manufacture of esters which serve as low temperature plasticizers for polyvinyl chloride, cellulosics and rubber. It is also a chemical intermediate for the synthesis of many organic compounds including wax substitutes, surfactants, insect repellents and synthetic lubricants. The Monsanto product is shipped in 50-pound bags.

FINANCIAL NEWS

Dayton Rubber Co.

Year Ended October 31: Consolidated net profit of $1,152,411, which is equal to $1.80 a common share, compared with $1,751,735, or $2.82 a common share, in the preceding year. Net sales for the fiscal year to October 31 amounted to $55,923,543, compared with $62,086,818 in fiscal 1953.

Electric Hose & Rubber Co.

Year Ended August 31: Net income of $449,086, which is equal to $1.56 a share, compared with $621,021, or $3.23 a share, in the preceding year. Net sales for the fiscal year ended August 31, 1954, amounted to $12,382,756, compared with $14,439,422 in the previous year.

Lee Rubber & Tire Corp.

Year Ended October 31: Net income of $1,400,295, which is equal to $4.97 a share, compared with $1,674,128, or $5.94 a share, in the preceding year. Net sales amounted to $39,385,382, compared with $46,302,361 in the previous year. This report covers the company and its domestic subsidiary.

A. G. Spalding & Bros.

Year Ended October 31: Net income of $779,553, which is equal to $1.47 a share, compared with $677,092, or $1.30 a share, in the preceding year. Sales for the year ended October 31, 1954, amounted to $27,192,465, compared with $26,706,122 in the previous year.

Collins & Aikman Corp.

Nine Months to November 27: Net loss of $760,000, compared with a net loss of $707,000 in the same period of the preceding year. Net sales for the 1954 period amounted to $29,876,000, compared with $32,193,000 in the previous year.

Midwest Rubber Reclaiming Co.

Year Ended October 31: Net income of $476,548, which is equal to $1.45 a common share, compared with $660,876, or $2.10 a common share, in the preceding year. Net sales amounted to $6,485,859, compared with $7,807,932 in fiscal 1953.

Appoints Two New Vice-Presidents

Columbus Coated Fabrics Corp., Columbus, Ohio, has announced that C. Gordon Jelliffe, formerly sales director of vinyl products, has been named vice-president in charge of industrial sales. John M. Altmaier, manager of manufacturing, has been elected vice-president in charge of plant operations.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 793.

New Stauffer Crystex Plant

Stauffer Chemical Co., New York, N. Y., has just completed a new $800,000 plant for the manufacture of "Crystex" at Monongahela, Penna. Proximity to the rubber industry, a major consumer of this special allotropic form of sulfur, was a chief factor in the choice of the new plant location. The new installations were designed and constructed by Stauffer's engineering department. The operation is based on continuous flow, converting ordinary rhombic sulfur to the allotropic form, which is radically different in its chemical and physical properties. Formerly a laboratory curiosity, the mu allotrope of sulfur was first commercially produced by the company in 1934 at their Chauncey, N. Y., plant. The Stauffer process involves rapid chilling of molten sulfur in carbon disulfide with the separation of insoluble polymerized allotropic sulfur, estimated to have a molecular weight of several hundred thousand.

Insoluble in all known solvents, Crystex may be used in formulations where ordinary sulfur would produce unwanted reactions, the company states. Reversion to the rhombic form can easily be accomplished by heating, permitting normal sulfur activity. This property of Crystex has resulted in its extensive use in the rubber industry where normal sulfur activity prior to curing results in undesirable "blooming". By contrast, insoluble sulfur remains inactive until the curing temperature causes normal vulcanization. Completion of the Monongahela plant brings the number of Stauffer sulfur plants to eight, further contributing to their leading position as a producer of processed sulfurs for industry and agriculture. Other plant locations are at Chauncey, N. Y., Bayonne, N. J., Freeport, Tex., Harvey, La., St. Louis, Mo., Berkeley, Calif., and Richmond, Calif.

Bluman Elected Vice-President

F. G. Merckel, president of Wallace & Tiernan, Inc. of Belleville, N. J., has announced the election of Dr. E. H. Bluman to the office of vice-president in charge of the Harchem Division. Dr. Bluman was formerly executive vice-president of W. C. Hardesty Co., Inc., a wholly-owned subsidiary. Dr. Bluman holds a degree of doctor of engineering which he received from the Institute of Technology of Berlin—Charlottenburg in 1920. He has been associated with the Hardesty organization since 1940. For a number of years prior, Dr. Bluman was active in the fatty acid and related industry in Europe as managing director of the German organization, Vereinigte Stearinwerke of Hamburg. The Harchem Division of Wallace & Tiernan maintains its fatty acid and plasticizer plant in Dover, Ohio.

National Acquires Kenmore

National Standard Co., Niles, Mich., has acquired the operating assets of the Kenmore Metals Corp., Jersey City, N. J. Financial details were not revealed. National Standard, a producer of tire bead and other specialty wire, absorbed Kenmore to expand its line of non-corrosive and decorative finishes for wire products.

Hungerford Purchases Walsamer

Hungerford Plastics Corp., Rockaway, N. J., has purchased the equipment, inventory, business, and good will of Walsamer, Inc. of Riverdale, N. J., and has entered into a long-term lease for the Walsamer plant. Payment for Walsamer was made with a combination of cash and Hungerford Plastics common stock. The amount of the purchase price was not disclosed. Walsamer, Inc., will, effective January 1, be operated as the Plastisol Molding Division of Hungerford Plastics. Walsamer is a pioneer in the molding of vinyl plastisol and rigisol plastic materials and has developed its own highly specialized equipment and molding techniques. The new division will be managed by Wallace Quackenbush, former president of Walsamer, and plans have been made to immediately increase the productive capacity of the new division. Hungerford Plastics is a leading producer of flexible vinyl injection moldings and it is stated that the acquisition of Walsamer will make it possible for the company to better serve its industrial customers throughout the United States by making it possible to supply requirements for solid and sponge plastisol and rigisol moldings, in addition to the company's present line of injection molded vinyl products.

To Receive DeWitt Smith Medal

Dr. John H. Dillon, director of the Textile Research Institute, Princeton, N. J., is to receive the Harold De Witt Smith Memorial Medal for 1955. This is the sixth award of the medal by Committee D-13 on Textile Materials of the American Society for Testing Materials. The medal will be presented to Dr. Dillon at a luncheon in his honor on March 17, during the spring meeting of Committee D-13, March 15-18, at the Statler Hotel in New York City. Dr. Dillon, who received his Ph.D. degree from the University of Wisconsin, joined the physics research group at the Firestone Tire & Rubber Co. in 1931, became head of the Physics Department in 1937, and assistant director of research in 1945. He was appointed director of research of the Textile Research Institute in 1946 and was made director of the Institute in 1951. Dr. Dillon is the author of many publications in both the rubber and textile fields, and holds a number of patents both in the United States and in foreign countries.

Mobay Chemical Names Two

The appointment of two group leaders in the Research Department of Mobay Chemical Co., Anniston, Ala., has been announced by Dr. Edgar E. Hardy, director of research. Dr. W. R. Mallory was named head of the process development group investigating processes for products and intermediates. Andrew S. Morecroft was named head of the isocyanate foam group concerned with applied research on flexible and rigid foam systems. The newly-formed company is jointly owned by Monsanto Chemical Co. of St. Louis and Farbenfabriken Bayer, A.-G., of Germany.

Develops New X-Ray Microscope

General Electric Co. has disclosed development of an X-ray microscope that "looks inside" magnified specimens and is capable of wide use in medical science, biology and industry. The disclosure, at an international scientific meeting in London, climaxes many years of effort in the laboratories of the U. S. and European countries to develop a practical device of this kind that can be produced in quantity. The G-E instrument, which magnifies up to 1,500 diameters, is expected to: Aid in the development of new alloys and in studies of such things as corrosion and welding of metals; help researchers learn more about tooth decay, diseases of the bones and such other human ailments as mineral deficiencies and hardening of the arteries; assist in the study of such things as the covering or bonding quality of paints, adhesives and finishes, and in some cases provide a speedy substitute for chemical analysis. In the study of alloys, plastics and composition rubber, the X-ray microscope shows the mixture of the materials and can identify them by their relative X-ray absorbing power.

Building Smaller Size Tires

Tires and tubes in the 5.00-14 size, to fit the popular Morris Minor, have been placed in production at its Buffalo, N. Y., plant by the Dunlop Tire and Rubber Corp. Domestic manufacture, the company announced, will provide sizable savings, as compared with imported tires, for owners of these cars. These tires, which will fit Minors manufactured in 1949 or later, are being produced in Dunlop's first-line Gold Cup quality, and with black sidewalls only. They are available through all Dunlop dealers.

Hoehler Joins Witco Sales Staff

Witco Chemical Co., New York, N. Y., has announced the addition of Harry G. Hoehler to its New York sales staff to cover the Philadelphia, Penna., and Baltimore, Md., sales areas. Mr. Hoehler, widely known in the region, has been active recently in the distribution of plastics and paper products. For 17 years he conducted his own chemical sales agency at Wayne, Penna., disposing of the business in 1953. He is a graduate of Pennsylvania State University.

WHO MAKES IT?

From time-to-time inquiries are received asking for manufacturers or suppliers of various items. Among recent inquiries, was one for the following:

The manufacture of a specialized vulcanizing press known as the "Simo Press."

Any reader having knowledge of the manufacturer of this press is requested to contact this office, and we will pass the information along to the original inquirer.

Dow Plans Dutch Subsidiary

Dow Chemical Co., Midland, Mich., plans to set up a wholly-owned subsidiary in the Netherlands this year. It will be called Nederlandsche Dow Maatschappij N.V., and will be located in Rotterdam. Starting about the middle of this year the new company will begin constructing a manufacturing plant and tank storage, warehouse and docking facilities on a 50-acre site it is leasing for 20 years in the Third Petroleum Harbor at Rotterdam. No estimates of total cost or scheduled completion date were given. The new subsidiary will process polystyrene plastics, magnesium alloys, glycols and other chemicals. Dow Chemical will use leased tankers to carry basic raw materials from its United States plants to Rotterdam. Its subsidiary will also buy Dutch and other European raw materials. Sales of the Dutch company, both in the Netherlands and abroad, will be handled by two other Dow subsidiaries, Dow Chemical International, Ltd., and Dow Chemical Inter-American, Ltd. It will have a five-man board of directors headed by Dr. H. L. Woltersom, Dutch industrialist and banker. The other directors are Dow executives.

Bedford-Bolling Co. Formed

Bedford-Bolling Co., successor to Bolling & Son, was recently incorporated to take over the used machinery business, along with some of the specialties of the parent company, Stewart Bolling & Co., Inc., of Cleveland, Ohio. The incorporators, who will also serve as administrators, are Stewart Norris Bolling, Stewart Bolling, and Edward Butler. A new plant is to be built on a tract of land on Route 8 in Bedford, Ohio, between Cleveland and Akron. The move was made necessary by the continuing expansion of Stewart Bolling's rubber and plastic machinery lines.

Sets World Safety Record

What is said to be a new world's record for safety in the rubber footwear industry has been set by the 5,500 employees of the Mishawaka, Ind., plant of the U. S. Rubber Co.—7,412,636 man-hours without a lost-time accident. The new mark betters the previous record in the rubber footwear industry, established in 1946 by the St. Jerome plant of the Dominion Rubber Co., Canadian subsidiary of U. S. Rubber, by 1,000,000 man-hours. The plant will receive an "Award of Honor", highest award of the National Safety Council for industrial safety performance.

Gets Tubeless Tire Patents

Two additional patents, the seventh and eighth granted to the B. F. Goodrich Co. covering basic features of tubeless tires, have been issued by the U. S. Patent Office. One of the two new patents going to the company covers a special inner liner which retains its characteristics at high temperatures encountered in high speed, heavy duty service. The other patent covers a special fabric-Butyl rubber combination which can be used as the air-retaining liner for tubeless tires.

LOS ANGELES NEWS

Barrett Division, Allied Chemical & Dye Corp., has announced the appointment of Edward M. Lemon as West Coast representative of chemical sales, with headquarters in Los Angeles. Mr. Lemon holds a B.S. degree from Western Illinois State College and an M.S. in chemistry from the University of Illinois. He joined Barrett's sales staff in St. Louis in 1948 after several years experience in teaching and educational administration and three and one-half years in the Air Force. Mr. Lemon replaces C. V. Fetty who has represented Allied Chemical & Dye Corp. in California on cylinder anhydrous ammonia since 1924 and on Barrett chemicals since 1927. Mr. Fetty will continue to handle the cylinder ammonia from his present office —923 East 3rd Street. Barrett's office will also remain at this address.

Industrial Research Laboratories, Los Angeles, Calif., fabricator of special cylinder liners under the trade name "Saloy" for manufacturers of plastic and rubber extruder machines, is completing an expansion program at 961 East Slauson Avenue, Los Angeles, Calif. According to Walter F. Hirsch, general manager, this will involve expenditures in excess of $100,000 for new plant and equipment and will enable the company to meet changing material and design needs of its customers as well as improve delivery schedules. The firm operates as a manufacturing division of the Honolulu Oil Corp., San Francisco, Calif.

The Spring Semester of the Tlargi Rubber Technology Foundation began Monday, February 7, 1955, with the following courses in Rubber Technology offered: Rubber Technology II; Chemical Engineering 442. Two units. Wednesday evenings, 7:00-8:40, Room 204, Engineering Building. This course consists of natural and synthetic rubbers, their chemistry, production, testing, compounding and uses.

Rubber Technology Laboratory II; Chemical Engineering 443bL. Two units. Monday evenings, 6:15-10:00. Room 204, Engineering Building, and Laboratory in Room 200, Engineering Building and Tlargi Laboratory, corner W. 36th Place and Hoover Street. One hour class and three hours laboratory. This laboratory course follows the first semester course and includes the processing of natural and synthetic rubbers and many physical testing methods of vulcanized products.

Rubber Technology III; Chemical Engineering 528. Three units. Thursday evenings, 7:00-9:40, Room 204, Engineering Building. This graduate course covers natural and synthetic rubbers, their structure, chemistry, production, applications, recent developments and historical background. Seminar work is included on important publications in rubber technology.

The tuition for each course is $20.00 a unit for each semester. Prerequisites for each of the three courses in Rubber Technology are organic chemistry and elementary physics. Dr. Harry L. Fisher, director of the Rubber Technology Foundation and professor of chemical engineering, teaches the two classes in Rubber Technology, and he and Joseph B. Larkin teach the rubber technology laboratory class.

L. E. Budnick, assistant treasurer and assistant plant manager of the Ohio Rubber Co., has been appointed to fill the unexpired term of the late R. D. Abbott as a member of the Advisory Board of the Tlargi Rubber Technology Foundation.

H. L. McKinsey has resigned from the L. H. Butcher Co. to join the Plastic Division of the Reynolds Metals Co.

Joseph B. Larkin of the PB Division, Byron Jackson Co., has been appointed vice-chairman of the Membership Committee of the Division of Rubber Chemistry, American Chemical Society.

Wayne Churchill, formerly associated with the Ideal Roller and Manufacturing Co. has joined the Thiokol Chemical Corp. Mr. Churchill is now in the East on a training program.

Robert G. Luskin of the Chemical Division of the Goodyear Tire & Rubber Co., has moved his staff and offices to the Los Angeles District Headquarters in the Central Manufacturing District.

Stoner Rubber Co. of Anaheim, Calif., has been purchased by the Carlisle Corp. of Carlisle, Penna. The name will remain the same as will personnel. N. S. Von Rohr, formerly president of Stoner Rubber, has been named general manager.

Howard Fisher, formerly associated with the Goodyear Tire & Rubber Co., has joined the W. J. Voit Rubber Corp. as assistant chief chemist.

Flexco, Inc., is moving into new offices at their plant location at 7856 Salt Lake Avenue, Huntington Park, Calif.

J. Butler, formerly associated with the Fullerton Manufacturing Co., has joined the staff of the Plastic and Rubber Products Co., Los Angeles.

William J. Haney, president of the Kirkhill Rubber Co., has been elected a director of the Merchants and Manufacturers Association for 1955.

Goodyear Tire & Rubber Co. has announced several promotions at its Los Angeles plant. Dickson Sheppard, formerly chief chemist, has been named technical superintendent, while Halsey Shepley, previously section chief, has been named chief chemist. Cecil Noble, formerly technical superintendent, has returned to Akron for a new assignment.

John Repar, associated with the Parker Appliance Co. since 1950, has been promoted to sales engineer of the Rubber Products Division with headquarters in Los Angeles. Mr. Repar will team with T. R. Carroll in covering the West Coast district. Mr. Repar was graduated from Ohio University with a B.S. degree in 1943. During his career with Parker, he has been chief chemist of the Los Angeles plant as well as divisional engineer.

Four men are believed to have died as the result of injuries sustained when a No. 11 Banbury exploded at the local plant of the U. S. Rubber Co. on January 21. Although complete details have not been made available at this writing, it is believed that a ram stuck and one of the operators threw in some solvent to release it, which is contrary to all safety regulations. The unit is understood to have blown both top and bottom. Damage is expected to total some $50,000.

Tire Prices Raised 2½ to 5%

On January 7, 1955, U.S. Rubber Co., Goodyear Tire & Rubber Co., and the B. F. Goodrich Co., announced a 2½ to 5% increase in the price of their passenger car, truck, and farm tires and tubes. The increases were generally attributed to rising costs, particularly the substantial increases in the price of natural rubber. Generally, all types of passenger car casings were increased 2½%. Small truck tires were also advanced 2½%, and large size highway and off-the-road tires were increased 5%. Farm casings, with the exception of those for tractors and implements, went up 2½%, and tubes increased 5%. Following the announcement of January 7, Firestone Tire & Rubber Co., General Tire & Rubber Co., Seiberling Rubber Co., Mansfield Tire & Rubber Co., Lee Rubber & Tire Corp., and others announced similar price rises.

Heel and Sole Institute Officers

At a meeting in New York City on January 21, the following members were elected as officers of the Rubber Heel and Sole Institute: *President,* Paul J. Fineman (Cat's Paw Rubber); *Vice-President,* Joseph E. Cox (Essex Rubber); *Treasurer,* M. J. Bernstein (American Biltrite Rubber). R. M. Hoffman (Victor Products) was elected a director of the organization until 1958. The Elastic Colloid Research Corporation, the research agency of the Rubber Heel and Sole Institute, elected the following officers: *President,* David W. Bernstein (American Biltrite Rubber); *Vice-President,* I. B. Calvin (Bearfoot Sole); *Secretary,* Forest Moor (Gro-Cord Rubber); *Assistant Treasurer,* E. Colman Beebe (Beebe Rubber); *Assistant Secretary,* Robert A. Winters. E. Colman Beebe and I. B. Calvin were elected as directors until 1958.

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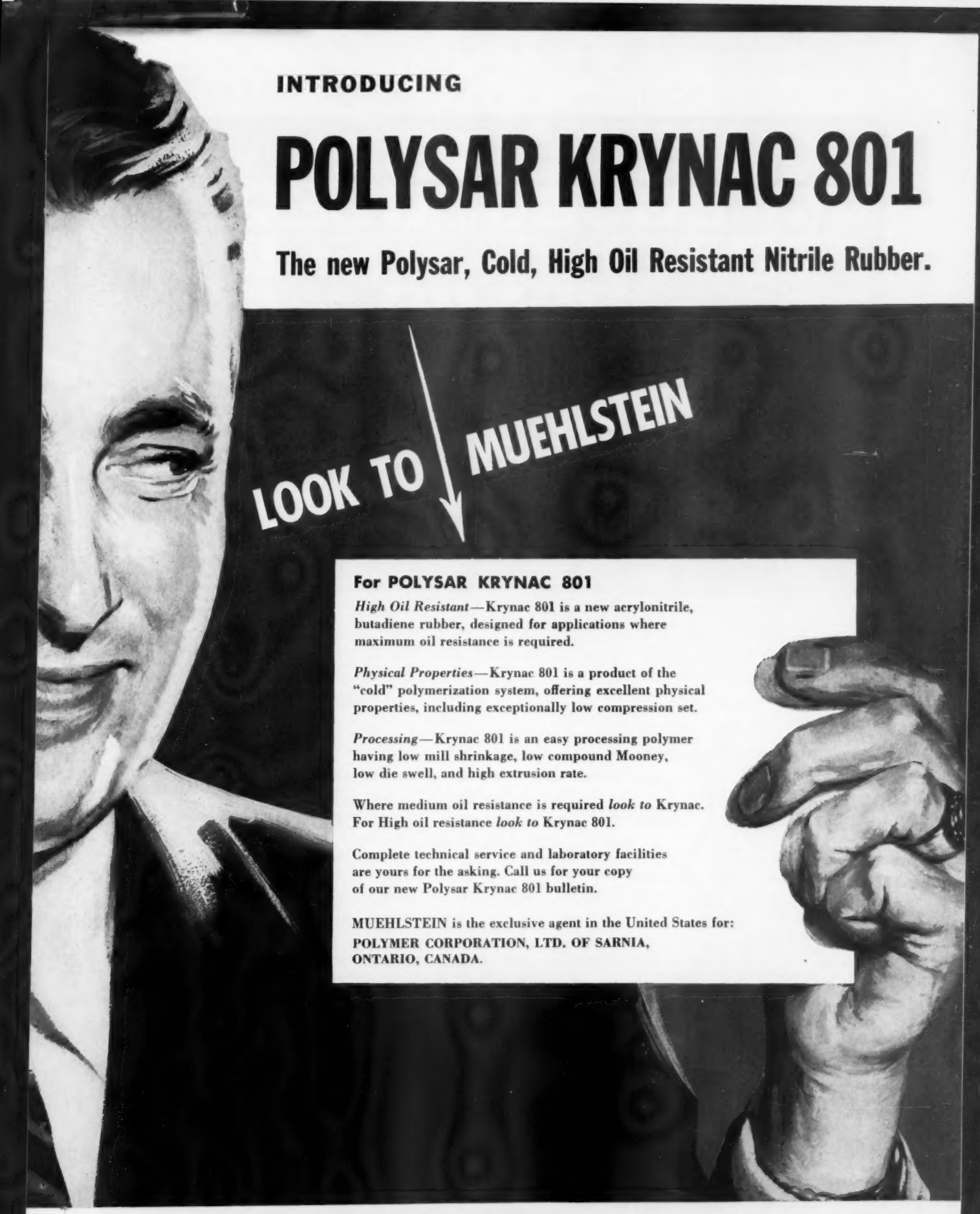

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CANADIAN NEWS

An announcement by the B. F. Goodrich Co. of Canada that tire prices would be increased 2½ to 8% effective February 1, will probably be followed by similar increases by other Canadian tire manufacturers, the trade believes. Ira G. Needles, president of Goodrich, said spiralling costs of natural rubber, which increased up to 85% during 1954, coupled with other production costs, made the increase imperative.

J. P. Anderson, president of Dunlop Tire and Rubber Goods Co., Ltd., said a tire price increase was long overdue and entirely justified. "We are studying the situation and will probably make some move in the very near future," he said.

R. C. Berkinshaw, president and general manager of the Goodyear Tire and Rubber Co., couldn't say whether their prices would be increased until a study of the "cost picture" is completed. "We are disturbed and have been for some time over the increased cost of rubber," he added.

T. Eaton Co. officials said there was "no indication" of any possible rise in prices for their brand of tires.

Officials of other firms also said the situation was being watched very closely but were not prepared to comment on price changes. However, most agreed that an increase by one manufacturer usually results in a general increase all around.

The Canadian government's sales and excise tax policy has been branded as "discriminatory and completely unfair" by Ira G. Needles, president of the B. F. Goodrich Co. of Canada, Ltd. He called for measures which would wipe out tax discriminations and urged the establishment of a realistic pattern for collecting sales and excise taxes. Mr. Needles told the Waterloo Cattle Breeders' Association, "It is difficult to understand the wisdom of legislation which places a 10% excise tax on a farmer's truck tires and considers them luxuries, while golf clubs and jewel cases are free from excise tax and are grouped with essentials."

Mr. Needles referred to the recent appeal to the tariff board to have all tires taxed on an equal basis as bringing to light a case of discrimination against the majority of the smaller tire retailers.

"Large tire distributors and retailers pay a 10% sales tax and a 10% excise tax on only the production cost of their big volume, special brand merchandise," Mr. Needles explained. "The majority of the small retailers to whom special brand tires are not available have to pay taxes on advertising, distribution and storage costs as well as production costs. This is grossly unfair."

Mr. Needles said the recent appeal to the tariff board by three standard brand tire manufacturers was an attempt to achieve tax equality. "Nobody wants to raise the price of tires nor do they want to pay more sales and excise taxes than they do already. But equality of taxation is a precious heritage of British tradition and our Canadian laws."

Five Canadian rubber companies, charging the Federal Anti-Combines Injunctions Law is an invasion by Parliament of a Provincial field, have been granted leave to appeal their illegal price-fixing convictions before the Supreme Court of Canada. The court, which has been studying the appeal application for months, gave no reason for its decision. The appeal likely will be heard at the next court session to begin late in April. The five companies, among nineteen rubber concerns found guilty of operating an illegal price-fixing combine, charge that Parliament has invaded territory that belongs to the Provinces under the constitution. A Toronto court, in addition to assessing fines totaling $250,000, granted an injunction prohibiting the companies from continuing any operations that might lead to a repetition of the combines charges. This is the last opportunity for appeal by the five companies, the Goodyear Tire and Rubber Co., Dominion Rubber Co., Ltd., Dunlop Tire and Rubber Co., Ltd., Gutta Percha and Rubber, Ltd., and B. F. Goodrich Rubber Co. of Canada, Ltd. Lower courts have rejected their appeals.

"A steady increase in the prices of natural rubber is causing a great deal of concern to the rubber industry," according to R. C. Berkinshaw, president of the Rubber Association of Canada. "The price of natural rubber has risen approximately 75% in the past nine months," he said, "and as natural rubber makes up 60% of the total rubber consumed by the industry, this price rise is having a severe effect on production costs. "The prices of synthetic rubbers, supplied mainly by the government-owned Polymer Corp., have remained steady throughout the year," Mr. Berkinshaw said, "but there still remains a net increase of about 45% in the cost of the major raw material of our industry."

A new factory to manufacture a wide range of foam rubber products, will be added to their existing plant in Kitchener, Ont. by the Footwear Division of the Dominion Rubber Co. Utilizing latest techniques, the factory and equipment will represent an investment of over $2,000,000. When fully operating, it could mean work for another 100 or more employees. Work on the new plant is to begin immediately, with completion set for early 1956.

Dominion Rubber decided to locate the new unit under its Kitchener footwear factory management, for two reasons: (1) To take advantage of a modern power plant opened last year, and (2) Because of abundant rubber knowledge in the area.

The Northern-Woodstock Division of United Rubber, Ltd., has announced the appointment of George F. Wright as Ontario district sales manager. Mr. Wright is well-known in the shoe industry and since 1947 has been associated with the rubber footwear industry in various capacities including several years of direct contact with the trade in southwestern Ontario.

The eight-week-old strike at the Textile Division of the Dominion Rubber Co. has ended with an agreement that increases the company payment to the welfare fund. The company will contribute $8.93 a month to the fund per employee and the employee's share is set at $1.95. The agreement represents an increase of 1½ cents from the company. A concession to the company is a drop of $1,000 in the life insurance coverage for employees.

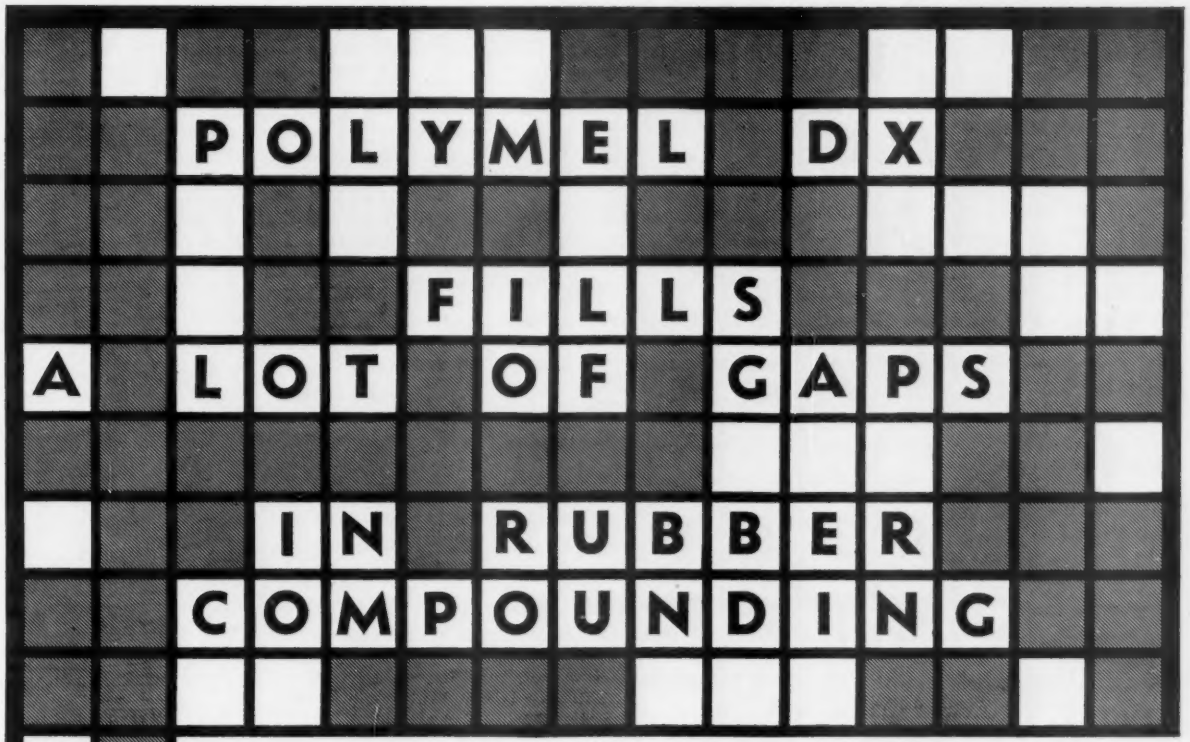
M. G. Morgan has been appointed general manager of manufacturing of B. F. Goodrich Co. of Canada, Ltd. A graduate of Virginia Polytechnic Institute, Mr. Morgan joined the Goodrich organization at Akron in 1938. A resident of Canada since 1950. Mr. Morgan previously held various appointments in Los Angeles, Calif., and Miami, Okla. He succeeds J. M. Robbins, who has been promoted to the parent company's Akron headquarters.

As part of an expanded program of product development and sales promotion, the separation of Advertising and Public Relations into two distinct departments has been announced by Dunlop Tire & Rubber Goods Co. of Canada, Ltd. E. G. Skirrow has been appointed manager of public relations. Mr. Skirrow has been with Dunlop for over 43 years and formerly was responsible for both functions. P. G. Byrnes has been appointed manager of advertising and merchandising. Mr. Byrnes joins Dunlop with a substantial background in advertising, merchandising and market research gained in Canada and the United States. Both appointments became effective as of January 1, 1955.

As of January 3, 1955, Charles Albert Smith Ltd., headquartering at 356 Eastern Avenue, Toronto, Ont., Canada, expanded its representation of Emulsol Chemical Corp., Chicago, Ill., for the entire dominion of Canada in the sale and distribution of Emulsol's broad line of surface active agents for the food, cosmetic, industrial and agrichemical fields.

Best Managed Companies

Four rubber companies have been awarded Certificates of Management Excellence for 1954 in the Sixth Annual Management Survey by the American Institute of Management. Firestone Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co. and U. S. Rubber Co., were among the 379 American and Canadian firms receiving the management citation after a continuing study of the operations of thousands of companies.



Few compounding ingredients offer the unusual combination of desirable qualities available in POLYMEL DX. This low-cost styrene copolymer resin functions basically as an efficient plasticizer for natural and synthetic rubber. However, the use of from 5 to 35 parts on the rubber hydrocarbon develops these extra, added benefits—

- ■ **Good flow and sharp detail in molded goods.**
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OBITUARIES

George D. Freestone

George D. Freestone, assistant treasurer of the Rubber Manufacturers Association, Inc., died on January 5 in Baldwin, N. Y. He was 48 years old. Born in Brooklyn, N. Y., Mr. Freestone attended Pace Collegiate Institute, New York University and the American Institute of Banking. From 1922 to 1929, he was associated with the Brooklyn Edison Co. In 1929, he joined the Bank of the Manhattan Co., where he remained until 1942. In that year, Mr. Freestone joined RMA as assistant secretary. From 1952, he held the post of assistant treasurer, serving on the Statistical Committee, General Accounting Committee, Tax Committee, and the Sales Research Committee of the Tire Division. Mr. Freestone was active in church and community affairs and was a member of the St. Andrew's Society of the State of New York. Funeral services were held on January 7 with interment in Greenwood Cemetery, Brooklyn, N. Y., on January 8. Mr. Freestone is survived by his wife, his son and a daughter.

Lee C. Eddison

Lee Corbin Eddison, a technical representative in the Chicago, Ill., office of the Dewey & Almy Chemical Co., died of a brain tumor on December 10 in St. Luke's Hospital, Chicago. He was 26 years old. He was a graduate of the Massachusetts Institute of Technology, class of 1949. Mr. Eddison is survived by his wife and son.

Joseph R. LaJone

Joseph R. LaJone, vice-president of the LaJone Rubber and Manufacturing Co., Chicago, Ill., died on January 22 in St. Anne's Hospital, Chicago. He was 42 years old. Services were held on January 25 with interment in Queen of Heaven Cemetery in Chicago.

James E. Skane

James E. Skane, an engineer and an executive of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., died on December 15 after a prolonged illness. He was 63 years old. Born in Oldham, England, Mr. Skane attended Brown University and started with Manhattan Rubber 34 years ago as a laboratory rubber specialist. He did considerable work on rubber compounding and textile improvements. Later, Mr. Skane became a sales engineer on rubber specialties. During World War II, Mr. Skane served in the Office of Rubber Director, Department of Commerce.

Freeman D. Mason

Freeman D. Mason, former president of the Bridgwater Manufacturing Co., died on January 16 at his home in Akron, Ohio. He was 84 years old. Born in Island Pond, Vt., Mr. Mason moved to Akron 69 years ago. Bridgwater was established in 1900 and incorporated in 1906. Mr. Mason became president in 1931, and he retired as president in 1949. He was a brother of the late Frank H. Mason, former vice-president of the B. F. Goodrich Co., who died in 1931. Mr. Mason is survived by a daughter.

Forrest J. Pyle

Forrest J. Pyle, director of operations for the Littleton, Colo., plant of the Mohawk Rubber Co., died unexpectedly on January 8 at his home in Denver, Colo. He was 51 years old. A native of Piketon, Ohio, Mr. Pyle joined Mohawk Rubber in Akron in 1933. While there he held several positions, including night superintendent and head of the laboratory. He was transferred to Littleton in June, 1953, as operations director. Mr. Pyle is survived by his wife, two daughters and two sons.

Interesting Rubber Articles

A number of interesting articles on various uses of rubber appear in the current issue of "Rubber Developments," available without charge from the Natural Rubber Bureau, 1631 K Street, N.W., Washington 6, D. C. One of the articles concerns itself with the testing of a rubber suspension system on British railways, while another covers the increasing use of latex foam cushioning in shoes. Yet another of the articles in the current issue discusses the use of conveyor belting in a wide variety of applications. The use of rubber in a potato harvester to prevent bruising of the potato is also discussed. Still another of the articles sets forth a new compounding technique for the production of rubber fenders.

Radiation Research Laboratory

Plans to install a new radiation research laboratory in Diamond Alkali Company's Research Center at Painesville, Ohio for investigating potential applications of atomic energy to a wide range of chemical processing operations were announced recently. Representing the latest step in Diamond's steadily expanding program devoted to basic and applied research on new products and processes, the new laboratory facility was scheduled for completion and operation by mid-February. The new laboratory will further the exploration of the intriguing possibilities presented by harnessing gamma rays for chemical applications, particularly for research on such reactions as polymerization, oxidation and chlorination.

Lifeguard Blowout Shield

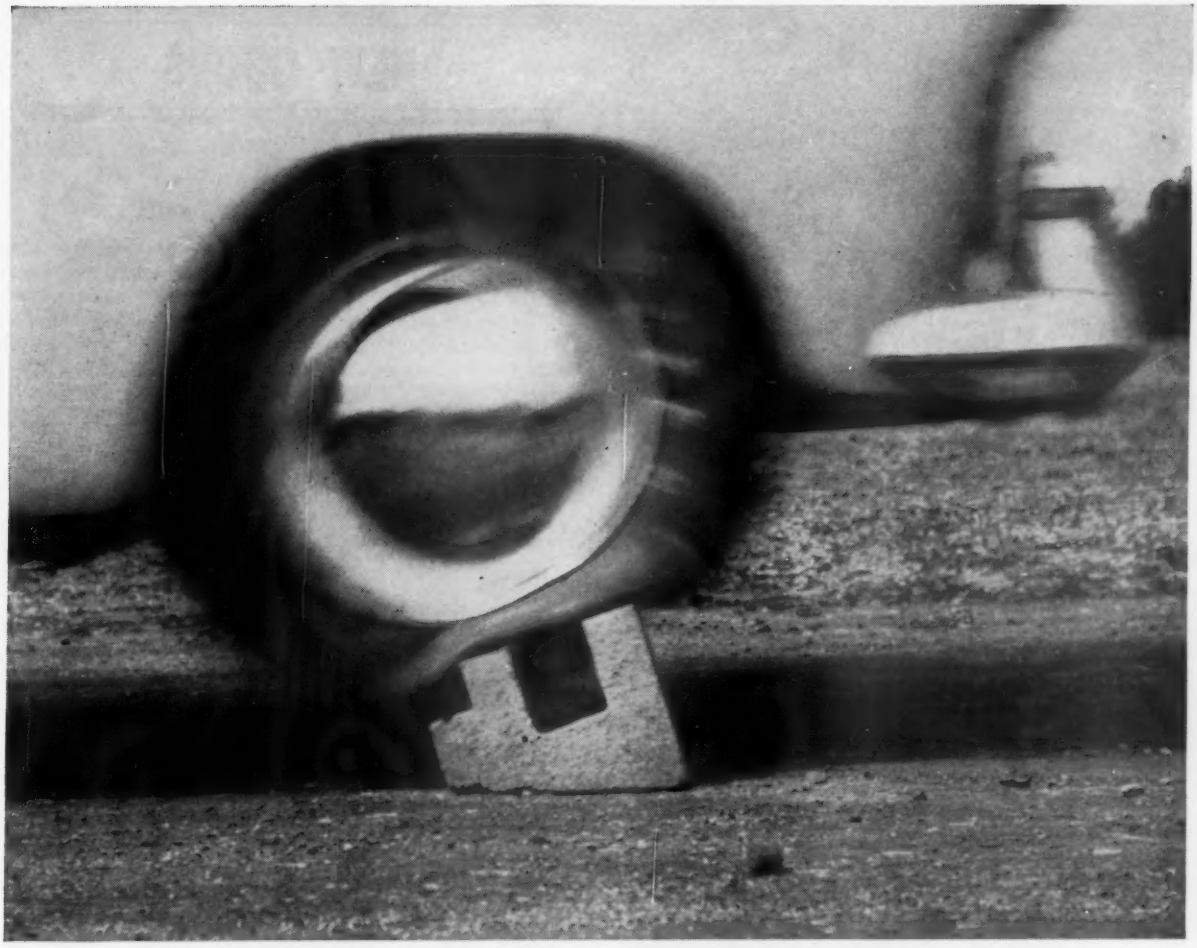
A new development by the Goodyear Tire & Rubber Co.—an inner shield of nylon fabric which is said to give the ultimate in blowout protection for tubeless tires—was announced recently by the firm. This new device, according to Goodyear, is an evolution of its LifeGuard safety tube principle for conventional tires—backed by 19 years' successful performance in preventing possible accidents from tire failures. Known as the "LifeGuard blowout shield", the new product now extends to tubeless tires this same blowout protection, plus additional advantages. The shield is priced considerably less than the LifeGuard tube. It also weighs but a fraction of its predecessor, therefore the shield improves tire and wheel assembly balance and is cooler running. Unlike a tube, the shield is a two-ply nylon diaphragm which forms an inner air chamber by sealing itself against the rim and tire beads. Wings or channels extending from the shield under the beads hold it securely in place. The company explains the shield's function like this: when inflating the tire, the air enters through a valve in the rim, inflates the shield (inner chamber) and passes through a metal grommet (small opening) in the shield into the outer chamber of the tire. But should a blowout occur, the air in the outer chamber will immediately escape, while the air in the inner compartment will leak out very slowly, restricted by the grommet. This keeps the tire sufficiently inflated and firmly seated on the wheel, thus permitting the driver to bring the car to a smooth, safe straight-line stop. The shield has visible mounting guides which show above the edge of the tire rim. These guides assure proper installation by indicating that the shield is locked in correct position. Manufactured in sizes 6.40/6.70 x 15, 7.10/7.60 x 15 and 8.00/8.20 x 15, the shield can be used with most tubeless passenger tires.

Introduces Neoprene Latex 736

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has introduced a new neoprene latex, Neoprene Latex Type 736. Type 736 is a modification of Type 735 containing additional stabilizers to permit easier addition to paper pulp in open and closed white water systems. Like Type 735, it is said to impart excellent wet strength and enhances the dry physical properties of the paper. It has a solid content of 34.5 ±1.5%, and a specific gravity of 1.06 (wet latex) and 1.23 (dry Neoprene solids) at 25°C.

Worth Co, Changes Name

Worth Co., formerly located at 1808 Jones St., Fort Worth 2, Texas, has announced a change in the company name to the Worth Rubber Co., Inc. Worth Rubber has moved to new and larger quarters at 2419 N. E. Thirty-Sixth St., P.O. Box 7104, Fort Worth. The company states that the new and modern manufacturing facilities will be used for the engineering and development of industrial and mechanical molded rubber products.



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Tires made with Circosol-2XH have greater resistance to abrasion, and can take impacts and a rougher all around beating than tires made with cheap softeners. Circosol-2XH helps inhibit the spread of cuts and helps tires go through hard driving on hot summer roads without damaging heat build-up.

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AA										X	X	X
AF					X		X		X			
AO or AO-X					X	X	X		X			
AR or AR-F			X		X							
BF or BG-X	X	X	X		X	X	X					
BGM or BGM-X	X	X		X		X						
CY					X				X			
DJ	X	X	X				X		X			
DL							X		X			
H			X		X			X	X	X	X	
LD	X	X	X	X	X	X		X				
ND or ND-X	X	X	X	X	X	X	X	X	X	X	X	
O	X	X	X	X		X	X		X	X	X	X
OS or OS-X	X	X	X	X			X					

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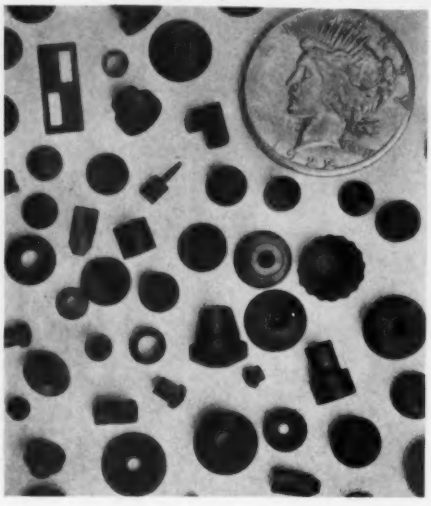
Product reodorization and odor abatement are no longer problems. Send now for detailed use-and-information booklet. Write to Industrial Reodorants Division (Alamask), Rhodia, Inc., 230 Park Ave., New York 17, N. Y.

Rhodia INC.

NEW GOODS

Custom Molded Rubber Parts

Custom molded rubber parts having complex structure can be produced in miniature with dimensional tolerances as low as .001-inch by means of injection molding, according to the Minnesota Rubber and Gasket Co., 3630 Wooddale Avenue, Minneapolis 16, Minn. Among the industrial products illustrated herewith are a spraying valve seal, relief valve, phonograph tone arm support, transformer terminal insulator, refrigerator



bumper and various hydraulic seals. Other shapes and designs can be made to customer specifications, the company states. Properties of the injection molding process permit greater quality control on these miniature rubber parts by eliminating the "flash" found in compression molding and such secondary operations as hand or machine trimming. The manufacturer claims that many compounds of neoprene, Buna N, and silicone rubbers can be injection molded for these applications.

Foam-Weev Multi-Use Mat

Crown Rubber Co., Fremont, Ohio, has introduced the "Foam-Weev", a new, multi-purpose mat. The mat is produced from soft, buoyant foam rubber fused to

tough, long-wearing plastic fiber. Skid-proof and easy to clean, the mat is available in four sizes and in four colors. The mat may be used in any room in the house as a floor mat, or it may be used on a stadium bench, etc.

Polyethylene Hinge-Cap Vials

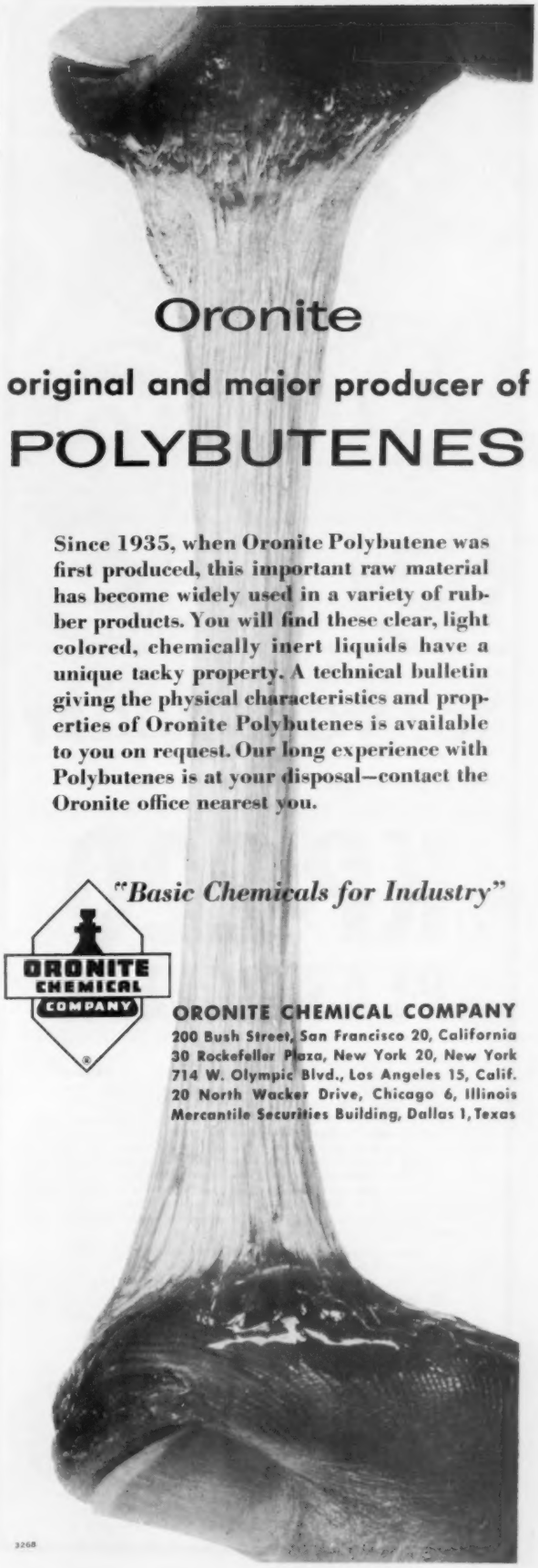
New and non-shattering vials with handy flip-up hinged caps are being made of Bakelite polyethylene for household safety and convenience by the Olympic Plastics Co., Inc., 215 E. Washington Blvd., Los Angeles 15, Calif. Opened or closed with one hand, these lightweight containers are designed to hold pharmaceuticals in standard weights, or other small, easy-to-lose contents. Resistant to acids, alkalies and water as well as most active chemicals, Bakelite polyethylene is also light

in weight and withstands wear and abrasion. The close-fitting lid is attached by a hinge to the vial and can be flipped open with a flick of the thumb. One of these vials, dropped from a medicine cabinet shelf, simply bounces instead of shattering when it strikes wash basin or floor. The translucence of the polyethylene makes it easy to read printed labels through the vial's wall. In natural or green color, these translucent vials are available in 2, 4, 7 and 10 dram standard sizes as shown above. Special colors and sizes are also available.

Joy Surgepruf Couplings

Joy Manufacturing Co., Oliver Building, Pittsburgh 22, Penna., has announced the development of "Surgepruf Couplings", non-skive units with a "double wedge" grip. These couplings are said to permit the use of more abrasion-resistant, rubber-covered hose. The exclusive "double wedge" grip permits the user to secure the extra long-wearing qualities of rubber-covered hose without any need for skiving the hose at the connection, the company states. No special assembly tools are required to make up Surgepruf assemblies. Surgepruf couplings, Joy Manufacturing declares, can easily and quickly be retightened on the job to stop a leak. Made to JIC Standards, assemblies are available in many sizes and lengths and in both single and double-wire reinforced types for medium-high and high pressure service, respectively.

Oak Rubber Co., Ravenna, Ohio, has introduced several new additions to its line of soft rubber toys. Based upon Walter Lantz cartoon characters, the line features full-color reproductions of "Woody Woodpecker", "Andy Panda", "Wally Walrus" and "Chilly Willy".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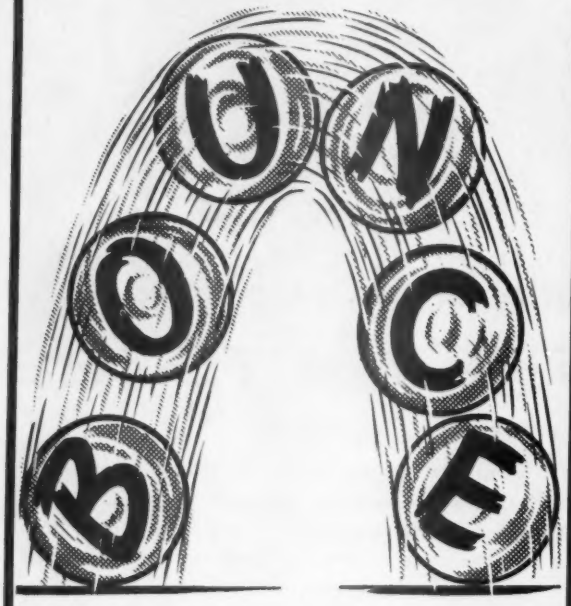

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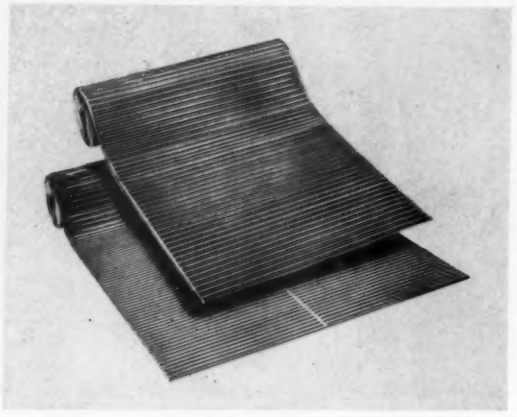
Double-Duty Rubber Mat

A new "Double-Duty" rubber mat which is said to increase safety and successfully combat excessive leg and foot fatigue has been announced by the Wear Proof Mat Co., Chicago, Ill. The new mat comes in two designs: "Niru Shad-O-Rug" and "Niru Cross-Rib Runner." Both are grease and chemical proof; both are made of specially formulated live rubber. The new live rubber forms raised ribs on the surface of the mat. These ribs offer a gripping surface for exceptional safety and serve to reduce worker fatigue at the same



time. They have a "wind-shield-wiper" cleaning effect also, making for easier cleaning, the firm states. The new double-duty Niru matting is grease, oil and chemical proof. This makes the matting particularly valuable in plants where workers stand most of the day where greases, alkalis, oils, alcohols or other chemicals are a problem. The Niru Cross Rib Runner is available in white or grey, 36 and 48 inches wide, up to 60-foot lengths. Niru Shad-O-Rug, also chemical and grease resistant, is available in 48-inch width only.

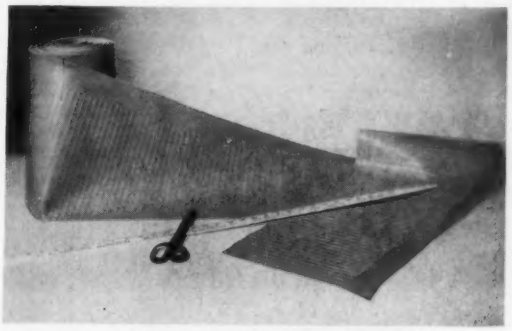
Adhesive Vinyl Wall Tile

Bolta Products Division of the General Tire & Rubber Co., Lawrence, Mass., has introduced a vinyl plastic wall tile which will stick to walls and ceilings with no need for extra paste, adhesives, etc. The vinyl tiles come to the home owner pre-pasted and are made to stick in place simply by wetting the back with water. Bolta Products states that the tiles will stay put on a variety of surfaces, including plaster, plywood, plasterboard and compressed hardwood. Unlike traditional rigid tiles, the new tiles are flexible and can be bent and cut with scissors and tailored to fit any wall area. Fingerprints, splattered foods and ordinary dirt can be removed with soap and water. The tiles are available in a variety of colors and differently textured surfaces.

New flexible dinner mats made of Geon vinyl and styled by Russel Wright, have been introduced by the Hedwin Corp., Baltimore, Md. Unlike other types of plastic mats, the new products are styled in original colors and textures. The mats can be cleaned easily with a damp cloth.

Rubbermaid Shelving

Sixty and thirty-foot rolls of permanent cushioned protection for institutional type shelves and counters, to be marketed as "Rubbermaid Shelving," has been announced by the Wooster Rubber Co., Wooster, Ohio. Designed for easy trimming and to lie flat without slipping or curling, the new shelving is also intended to cut down breakage of glasses and china, reduce kitchen



clatter, and by reason of its permanence and easy maintenance, reduce overhead costs in dish storage. Two sizes of shelving are now being manufactured. One is 11¾ inches wide and comes in 60-foot rolls. The second is 22 inches wide and is available in 30-foot rolls. Both are described as resistant to hot water, detergents and grease, with a ribbed surface design that prevents slippage and makes possible fast air drying of glassware.

Dayflex Vacuum Cleaner Hose

Dayton Rubber Co., Dayton, Ohio, has introduced a new vacuum cleaner hose that will not twist, curl, or "fight back" at the user. Lighter in weight, the new hose employs a specially-tempered spiral wire core which

gives the hose maximum flexibility and strength. The long-wearing cover is smooth and easy to clean. A damp cloth can be used to wipe off any slight appearance of dirt. The new hose is also said to offer better suction than other types.

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Acid Value	197 — 202	190 min.
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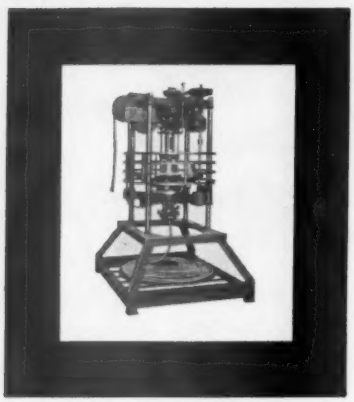

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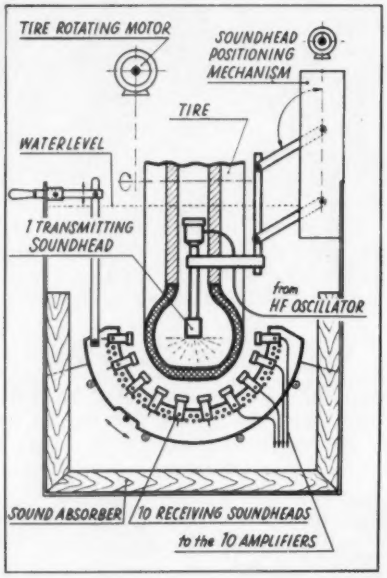
NEW EQUIPMENT

C-W Ultrasonic Tire Tester

Ultrasonic testing apparatus that overcomes a problem long costly to the rubber tire industry has been developed by the Curtiss-Wright Corporation, Wood-Ridge, N. J. Unlike ordinary tire manufacturers' inspection equipment, the Curtiss-Wright ultrasonic tester selects only the larger, disqualifying pockets in rubber in reporting a fault. It ignores non-defective bubbles in the rubber mass. A transmitting transducer located inside the tire radiates a signal through the sidewalls and treaded areas. A series of pick-up detecting transducers search for tire defects represented by attenuation of the sound signal passing to the outside.



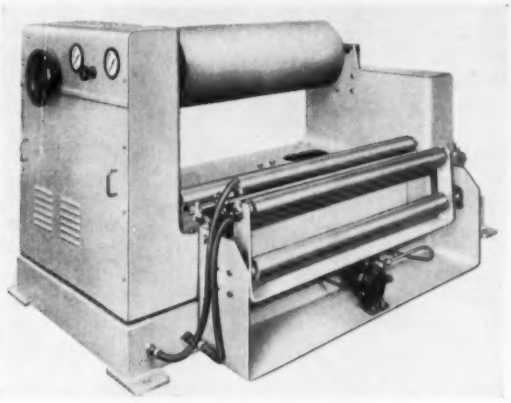
The Curtiss-Wright tire inspector is entirely automatic except for the tire insertion and removal. The tire is automatically rotated through 360° at a predetermined speed exposing all vital areas to careful inspection. The unit consists of a large trough filled with water and rubber wetting agents. The tire rotating mechanism is an easy to operate, integral part of the trough. A directional transmitter is automatically lowered inside the tire, and radiates a 100 KC/S signal. Ten detecting transducers are strategically located around the outside of the tire and view a limited area of the tire. By predetermined stepped rotation every vital part of the tire is inspected.

The electrical portion of the unit is combined in one large metal shielded cabinet. The 100 KC/S transducer is excited by a high powered electronic oscillator. Each of the ten flaw detecting transducers feeds a signal to a separate amplifying system controlling a red flaw light, and relay switch capable of sounding audible alarms.

A non-technically trained operator can prepare and completely check an average automobile tire in less than one minute; larger truck or airplane tires take approximately 3 to 4 minutes depending on the area to be examined.

Askania Backstand Unit

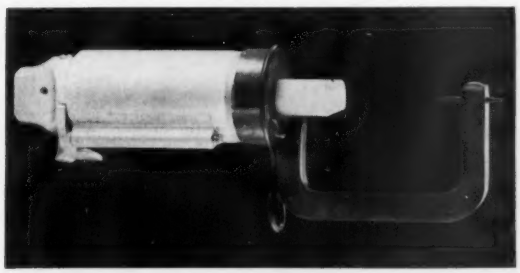
A new backstand which controls both tension and edge position of a moving web as it is fed to a rewinder, slitter, converting machine or other devices requiring such control, has been introduced by the Askania Regulator Co., 240 East Ontario St., Chicago 11, Ill. Tension may be maintained at any selected value up to 4 pounds per inch within 5% at any steady web speed. Edge position is maintained within .015 inch with a runout of plus or minus 3 inches from center position.



The backstand operates at speeds up to 1200 fpm, and a larger model will accommodate a 2000 pound roll measuring 54 inches in width and 48 inches in diameter. Accurate control is said to be maintained down to a three-inch core. The tension control system is fully hydraulic, and use of incompressible fluid to transmit signals is reported to cut response time to one-fourth that of an otherwise comparable pneumatic-hydraulic control system.

Tubeless Tire Valve Inserting Tool

Inserting valves into the rims for tubeless tires is said to be relatively simple with the new Rotor M-1161 Valve Inserter, product of the Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, Ohio. The unit operates on 80 to 90 pounds of air and has a C-type yoke that spans all wheels. The action of inserting the valve comes from



an air cylinder and return spring. The rubber valve is started in the rim valve hole, the pin in the end of the yoke is inserted into the bottom of the valve, and a single stroke of the inserting tool pushes the valve into place. According to the manufacturers, valves can be inserted three to five times faster with the new Rotor unit than any hand-operated tools available.

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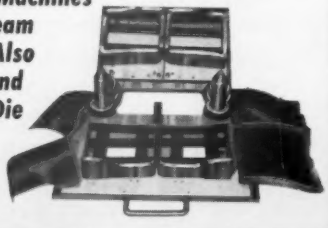

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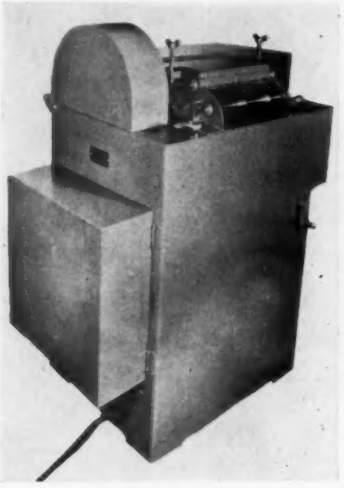
High Capacity Strand Pelletizer

Production of a new, high capacity strand pelletizer, which can pellitize any extruded plastic strand material, has been announced by Ball & Jewell, Inc., 22 Franklin St., Brooklyn 22, N. Y. The entire machine is of extra-heavy, all-steel construction. New design features include feed and cutting chambers and pellet discharge



chute made of solid stainless steel. All parts are easily exposed and accessible for quick and thorough cleaning. A dynamic new cutting principle provides extremely long knife service and eliminates frequent blade re-sharpening. Pellets are always uniform and cleanly cut. Variable speed drive transmission provides infinite speeds to accommodate complete range of extruder capacity, with nothing more than the turn of a hand wheel.

C. G. Sargent's Sons Corp., Graniteville, Mass., has announced the development of a new **portable self-contained dryer.** Designed primarily as a research laboratory dryer for pilot plants and for industrial and school laboratories, the new unit is full size, is fully instrumented, and uses either steam-heated or electrically-heated air. It is equipped for tray drying or for pole, roll or plate drying, as desired.

Designed to provide industry with a serviceable pump at lower cost, the **Powr-Pac Pump** has been introduced by the Aldrich Pump Co., Allentown, Penna. The new unit is a 2½-inch stroke, 25 hp, direct flow triplex pump. An outstanding feature of the new pump is said to be the sectionalized fluid-end design, with individual fluid-end sections being easily replaced at a fraction of the cost of the entire fluid-end.

A new series of **back pressure relief valves,** available in pipe sizes from ½ to 2 inches in various metal bodies and suitable for pressures up to 400 psi, has been introduced by the A. W. Cash Valve Mfg. Corp., Decatur, Ill. Called the Type FR valves, they feature a patented floating ring principle which is said to substantially remove all of the friction caused by drag of a piston and cylinder found in ordinary type valves.

A completely new field of spray finishing is expected to be opened with the recent introduction of a **catalyst spray gun** by the DeVilbiss Co., Toledo, Ohio. Creation of the new gun is expected to speed resin development and formulation, since it was designed to simultaneously spray plastic resin and catalyst and, according to the company, is the only unit made which assures a uniform mixture of both.

The VacForm Mobile Pump Wagon, described as being the first and only **movable vacuum pump unit** now available, has been introduced by the Vacuum Forming Corp., Port Washington, N. Y. When the unit is pushed into place, it is connected by a heavy-duty hose to the equipment to be used in the vacuum application, such as presses, sealers, driers, molding units, etc.

A new, all-vinyl **push-pull plastic valve,** which fits all standard connections, has been developed by the Halkey-Roberts Corp., Paramus, N. J. Intended for low cost inflatable items of all kinds, the valve is said to be virtually indestructible. It can be easily operated by mouth but is adaptable to auto, bicycle or football pump operation as well as service station hose. The new valve can be disassembled for cleaning.

An improved line of high-strength aluminum alloy soft-faced **industrial hammers** is being marketed by the Savoy Products Co., Hudson, Ohio. The hammers are cast with knurled handles which will not snap or break, are non-ferrous and anti-magnetic, and will not mark machines or machine parts. According to the company, they will outlast lead hammers twenty times

A new **spring-type work positioner,** designed to provide a work table which positions to any desired height, has been developed by the Rack Engineering Co., Connellsville, Penna. It is a mobile unit which adjusts to desired table heights by a series of calibrated springs. The standard unit offered has a capacity of 1,000 pounds and will move loads up to or down from a 42-inch level above the floor.

Butyl Reclaim

(Continued from page 725)

this country better than 600,000 long tons of Butyl. The majority of this, by far, has been consumed in inner tubes, and statistics indicate an accumulation of 22,000 to 25,000 tons per year of discarded tubes. Therefore, an ample supply of raw material is available for some years to come. As an illustration, it is still possible for reclaimers to purchase natural rubber red inner tubes which have not been produced in any sizeable quantity since prior to the war.

A good Butyl reclaim usually sells for approximately 12½c a pound, delivered in carload lots, with a small differential charged for less carloads. In closing, may I suggest that if you are not already familiar with Butyl reclaim, that you investigate it for possible application to your product.

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REVIEWS

BOOKS

Design and Analysis of Industrial Experiments. Edited by Owen L. Davies. Published by Hafner Publishing Co., Inc., 31 East 10th St., New York 3, N. Y. 6½ x 9½ in. 636 pp. $10.00.

To encourage the use of statistical methods both within its own organization and in industry generally, Imperial Chemical Industries, Ltd., arranged for publication of the book entitled "Statistical Methods in Research and Production" in 1947. That work made no attempt to deal with the design of experiments, since it was felt the subject was important enough for a volume of its own. The subject is handled in this new volume, which was also published for Imperial Chemical Industries.

Written by a team of six I.C.I. chemists and statisticians, and edited by one of them, the current work deals comprehensively with the application of modern statistical methods to the design and analysis of experiments in chemical and allied fields of research. A special feature of the book is found in the many illustrative examples drawn from actual investigations in industry, several of them pertaining directly to the field of rubber technology. Although complete in itself, the present work is a sequel to the first book, and frequent references are made to the initial volume.

The book is divided into eleven chapters, covering such subjects as the planning of simple comparative experiments, investigation of sampling and testing methods, randomized blocks and Latin squares, factorial experiments, and the determination of optimum conditions. The latter chapter is devoted to important new methods of determining optimum conditions for operating chemical processes with a minimum amount of experimental work. These methods are of considerable practical value in the chemical industry, and have a wide field of application. The book should prove of direct value for research workers of all kinds.

•

Adhesive Bonding of Metals. By George Epstein. Published by Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y. 4¼ x 6¾ in. 218 pp. $2.95.

The purpose of this book is to give sufficient details so that an engineer or technician faced with the problem of joining two materials will be able to determine if an adhesive-bonded joint would be advantageous, what type of adhesive to select, how to employ the adhesive, and how to design the joint for optimum performance. In particular, adhesives are considered which are most generally employed with metals. In order to familiarize the reader with the physical and chemical properties of adhesives, a fairly comprehensive discussion is given of the chemistry and formulation of adhesives, especially in relation to the properties of the cured adhesive bonds. A rather extensive treatment also is presented of the various factors affecting the strength of adhesive bonds, including the concept of joint factor and its use. Sandwich construction is considered in some detail, especially with reference to the roles played by adhesives. An entire chapter is devoted to elevated-temperature-resistant adhesives for metals.

•

Screw-Type Extruding Machines. (Bulletin No. 195). Farrel-Birmingham Co., Inc., Ansonia, Conn. 8½ x 11 in. 32 pp.

This newly-published bulletin describes and illustrates plasticators, pelletizers, extruders, strainers, strainer-extruders, tubing machines, German mixers and special-purpose machines, designed and built by Farrel-Birmingham principally for use in the rubber and plastics industries. This is said to be the most complete variety of heavy-duty machines of this type offered by any manufacturer, and the publication, with the aid of 61 photographs and diagrams, covers the entire line.

The Services Rubber Investigations. Published by H. M. Stationery Office, Atlantic House, Holborn Viaduct, London, E. C. 1, England. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 6 x 9½ in. 324 pp. $5.75.

Rubber technologists will recall the series of "Manufacturers' Memoranda" and "Users' Memoranda" which were issued during and subsequent to World War II in England by the Services Rubber Investigations Panel. These memoranda were compiled by and largely based on investigations conducted by the Rubber Laboratories of Imperial Chemical Industries, Ltd., which were headed at the time by Dr. W. J. S. Naunton. This book is a revised collection of the "Users' Memoranda."

The book is divided into nine chapters, as follows: (1) Properties of Synthetic Rubbers and Rubberlike Materials; (2) Aging, Heat and Oil Resistance of Natural and Synthetic Rubbers at Elevated Temperatures; (3) Natural and Synthetic Rubbers at Low Temperatures; (4) Natural and Synthetic Rubbers as Engineering Materials; (5) The Shrinkage of Natural Rubber in Molding; (6) Creep Phenomena of Natural and Synthetic Rubbers; (7) Effect of High Grade Aviation Fuels on Synthetic Rubbers; (8) Hardness Measurements of Natural and Synthetic Rubbers; (9) Identification and Determination of Natural and Synthetic Rubbers. Author and subject indexes are provided.

A good deal of useful information for rubber chemists and technologists is to be found between the covers of this new book, which is a welcome addition to the rubber literature. Whereas the earlier memoranda were restricted somewhat in distribution, the present collection is available to the entire industry.

•

Trucks, Trouble, and Triumph. By Wayne G. Broehl, Jr. Published by Prentice-Hall, Inc., 70 Fifth Avenue, New York 3, N. Y. 6 x 9¼ in. 226 pp. $5.50.

An Indiana University School of Business Research Report, this book chronicles the growth of the trucking industry, and particularly the history of the Norwalk Truck Line Co. The growth of Norwalk has been inextricably linked with the life of its founder and president, John Ernsthausen. Throughout the "biography" of the business is woven this personal story, with its own set of troubles and triumphs. Those interested in the more specific management problems and policies will find analytical material covering every phase of motor carrier operation. Federal and state regulations are discussed at length, as is the relationship of the motor carrier to its competitors, particularly the railroads. Equipment, operations, and personnel policies are considered, with emphasis on their applications to decentralized terminal operation. Much of this information is made available for the first time. Of particular interest is the unique plan of Mr. Ernsthausen for transferring ownership of the company from himself to his employees.

•

Synpro Stearates. Synthetic Products Co., 1636 Wayside Road, Cleveland 12, Ohio. 8½ x 11 in. 26 pp.

A technical booklet on metallic stearates, this publication contains the latest information about the uses and benefits of stearates and associated chemicals. The booklet is fully illustrated and features the history of the company, new plant layout, types of stearates, and details metallic soap specialties and manufactured products. Among the stearates described are aluminum, barium, cadmium, calcium, lead, lithium, magnesium and zinc.

•

Dry Blenders. (Bulletin No. 800). J. H. Day, Inc., 1144 Harrison Ave., Cincinnati 22, Ohio. 8½ x 11 in. 8 pp.

Complete with latest models and construction features, this profusely illustrated folder contains complete descriptions of Day Ribbon Blenders and Jumbo Mixers, which can be used for mixing powders, pastes, or liquids. Specifications, dimensions and ordering information for all models are included, and a special section points up significant features of the equipment.

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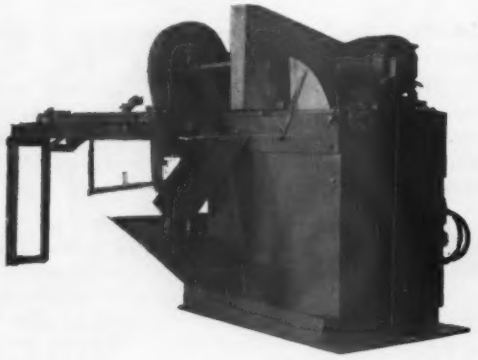

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Carbon Black: A Survey for Rubber Compounders. By M. L. Studebaker. Philblack Sales Division, Phillips Chemical Co., 318 Water Street, Akron 8, Ohio. 6 x 9 in. 52 pp.

This brochure presents information concerning carbon blacks, their properties, processing and compounding. It is designed for rubber compounders and technicians, to stimulate their thinking and to suggest lines of investigation which may be followed by those working in the field of rubber compounding. The brochure describes the production of the various types of carbon black, including the furnace, channel, thermal and acetylene processes. The structure of carbon and the composition of carbon black are outlined while such matters as particle size and surface area are discussed. The reinforcement of rubber by carbon black is described for both vulcanized and unvulcanized stocks. The brochure employs tables, charts and graphs to tell its story and offers a complete listing of literature references.

•

Pioneer and Pacemaker: The Story of Firestone. Firestone Tire & Rubber Co., Akron, Ohio. 8½ x 11 in. 64 pp.

In pictures and words, this booklet tells the story of the growth of the Firestone Tire and Rubber Co. from its original status as a small firm selling solid rubber tires to its present position of one manufacturing and selling thousands of products throughout the world. In telling the story of the Firestone organization, the book touches upon the early activities of the company and its contributions to the economy and defense of the nation through the years. Its continuing activities in research and development are also outlined. The booklet also discusses employee benefit and training programs, many of which serve as a model for industry. While it is a brief history, it is a complete one insofar as the highlights of the Firestone story are concerned.

•

The ABC's of Spray Equipment. DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio. 5¼ x 8 in. 64 pp.

An adequate working knowledge of spray painting is contained between the covers of this publication which is written in non-technical language and illustrated with drawings to give a clearer picture of the over-all spray painting subject. The booklet has a question and answer format. The questions used are the most common asked in the company's spray painting school. This is the third edition of the booklet and it is twice the size of the preceding edition. Each basic item of equipment used in spray painting is given comprehensive editorial treatment covering every phase from operation to maintenance. The booklet can also be of considerable value to spray operators because it lists the remedies for any troubles which may affect a good finish.

•

All-Steel Shaft Mounted Drives. (Bulletin No. 7101). Falk Corp., 3069 West Canal Street, Milwaukee 8, Wisc. 8½ x 11 in. 8 pp.

The complete story on Falk Shaft Mounted Drives is contained in this bulletin. Features of the drives are described and illustrated and information offered on assembly and maintenance. The bulletin tells how to select the proper drive for a given task and discusses both single reduction and double reduction types. Other factors discussed include sheave ratios, minimum sheave diameters, dimensions and bushings. Some of the applications to which the drives may be put are also outlined.

•

C-8 Epoxy Resins and Hardeners. Bakelite Co., 260 Madison Ave., New York 16, N. Y. 8½ x 11 in. 16 pp.

This booklet describes the use of "C-8" epoxy resins for tools, dies, jigs, fixtures, adhesives, laminating, casting, potting, embedding, and encapsulating. Since Bakelite epoxy resins are said to be such excellent adhesives, a special section is appended on release agents for molds. Data on storage life and handling of these epoxy resin compounds, their working life, mixing, fillers and cleaning equipment are explained in a section on compounding.

Texas 109: A Super Abrasion Channel Black. Sid Richardson Carbon Co., Fort Worth Club Building, Fort Worth 2, Texas. 8½ x 11 in. 24 pp.

This technical bulletin describes Texas 109, a new highly reinforcing carbon black made from natural gas. It is a super abrasion channel black, produced by the channel process up to a certain point. The chemical and physical properties of the black are presented, and then it is evaluated in L.T.P. GR-S, in natural rubber, in butadiene-acrylonitrile type rubber, and in polychloroprene rubber. Factory processing characteristics of Texas 109 in L.T.P. and in natural rubber are presented. The bulletin also presents the results of four comprehensive road tests which were run with Texas 109 in L.T.P. tire tread compounds.

•

Manufacture of Rubber and Vinyl Products at Sun Rubber. Industrial Products Division, Sun Rubber Co., Barberton, Ohio. 8½ x 11 in. 24 pp.

This catalog takes the reader on a tour of the plant of the Sun Rubber Co., showing the facilities available and the manufacture of some of the many rubber and vinyl products made there. Core and compression molded products, extrusions, die cut parts, laminations, and rubber-to-metal bonded parts are described and illustrated. The company's activities with reference to vinyl products, including design, models, molds, etc., are outlined and some of the vinyl products manufactured are shown. Other sections of the catalog are devoted to the management of the company, how it is organized, and how it is run.

•

Revertex Concentrated Rubber Latex. H. L. Blachford, Inc., 24 Commerce Street, Newark 2, N. J. 8 x 10 in. 32 pp.

This bulletin outlines in general and non-technical terms the properties of Revertex concentrates and lists the manufacturing processes in which they are commonly used. One section of the booklet is devoted to a comparison of Revertex natural rubber concentrates with synthetic latices. Photographs depict the facilities of the Revertex laboratories and factory at Harlow, Essex, England. Other photographs show the uses to which the material has been put, including the treatment of textiles, in foam rubber, in rubberized hair pads, in dipped and molded articles, in cement compounds, in reconstituted leather from waste fibers, in Revertex bitumen compounds, etc.

•

Durez Resins in the Rubber Industry. Durez Plastics and Chemicals, Inc., North Tonawanda, N. Y. 8½ x 11 in. 12 pp.

Increased usage of phenolic resins throughout the rubber industry has prompted the company, phenolic specialists for the past thirty-three years, to compile this new bulletin on the subject. The pamphlet points out that the development of new resins, new techniques, and greater experience has resulted in a continually increasing market. Synthetic rubber latices, solvent-type adhesives, and the compounding of hard and semi-hard rubber stocks are among the subjects discussed. The bulletin contains a brief outline of these uses and of the various Durez resins which are available.

•

Machinery Catalog for Rubber and Allied Industries. G. F. Goodman & Son, N.E. Corner Richmond Street and East Columbia Avenue, Philadelphia 25, Penna. 9½ x 11¼ in. 8 pp.

This catalog of machinery for the rubber industry illustrates and describes a wide variety of units and auxiliary equipment. Among the units described are a hydraulic crude rubber bale cutter, a dust collector, a 6 by 12-inch laboratory mill, a rubber slug cutter, a vibratory feed inspection table, and a two-way washer dryer. Specifications are furnished for all the units, as are operating features. An accompanying price list furnishes basic prices for both the units and the auxiliary equipment.

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MARKETS

NEWS-PRICES

NEW YORK, FEB. 3, 1955

Natural Rubber

Since our last report (January 6), the average price of spot rubber on the New York Commodity Exchange has moved in the extremely wide range of 412 points, high for the period being 36.12c reached on January 26, and low being 32.00c reached on January 11. The average price of spot rubber for the month of January was 33.92c based on 21 trading days. This compares with an average of 29.88c in December, 1954.

The rubber market clearly reflects the political news regarding Formosa. The trade believes that the erratic behavior of the market will continue until the situation in the Far East stabilizes.

Meanwhile, traders in Malaya are looking forward to the next twelve months with great optimism. Officials of the Federation of Rubber Trade Associations in Malaya declare that a continuing price rise is "inevitable." Malayan rubber is now selling at the highest prices in two years.

It was stated that business in the United States and throughout the world was booming and still greater demand for Malayan rubber is expected. The Federation predicts that world consumption of natural rubber, which has been hitting 2,400,000 tons annually, would rise to 3,600,000 tons by 1960.

Soviet Cuts Rubber Buying

According to reports from Singapore, Soviet Russia and her satellites heavily slashed their direct buying of Malayan rubber in 1954, but traders stated that this was no criterion of what they actually received. Russia bought 3,243 tons, compared with 4,539 in 1953. Czechoslovakia, Poland and Bulgaria together took 8,117 tons in 1954, less than half the previous year's figure.

Rubber dealers emphasized that it was difficult to determine how much Malayan rubber went to Iron Curtain countries because they allegedly bought out of exports to Britain and Continental Europe. Official statistics show that Malaya exported 915,000 tons of rubber in 1954, a gain of 63,000 over 1953. Top buyers were Britain, the United States, France, West Germany, Italy, Canada, South Africa, Argentina and the Netherlands.

Ceylon Invites Buyers

Ceylon has freed sheet rubber for export to countries other than Communist China, because world prices have risen above those offered by China. Ceylon is under contract to provide China with 50,000 tons a year. Some traders in Colombo feel that if the upward trend in world prices continues, Ceylon will lose on the 30,000 tons still due for shipment to China unless the Ceylonese government asks China for a price revision.

The 20,000 tons already shipped was priced at approximately 32c a pound. This is the first time that Ceylon has been faced with the problem of losing on rubber exports to China. Previously, the situation was such that China paid well above world prices.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM JANUARY 7 TO FEBRUARY 3

Jan.	Spot	March	May	July	Sept.	Sales
7	33.00	32.60	32.13	31.75	31.35	83
8	....	....	....	....	....	....
9	....	....	....	....	....	....
10	32.00	31.85	31.30	31.10	30.85	74
11	32.75	32.70	32.30	32.00	31.75	133
12	32.38	32.15	31.80	31.55	31.25	87
13	32.12	32.00	31.80	31.50	31.20	80
14	32.25	32.20	32.00	31.80	31.45	60
15	....	....	....	....	....	....
16	....	....	....	....	....	....
17	33.12	33.06	32.90	32.70	32.40	167
18	33.50	33.42	33.25	33.00	32.80	111
19	34.25	34.20	33.95	33.70	33.40	184
20	34.25	34.20	33.90	33.60	33.40	99
21	34.88	34.75	34.35	34.05	33.85	185
22	....	....	....	....	....	....
23	....	....	....	....	....	....
24	35.75	35.90	35.67	35.40	35.20	245
25	35.88	35.90	35.70	35.43	35.20	185
26	36.12	36.40	35.90	35.50	35.35	188
27	35.62	35.80	35.55	35.10	34.70	161
28	35.75	36.10	35.50	35.10	34.75	115
29	....	....	....	....	....	....
30	....	....	....	....	....	....
31	35.88	36.25	35.70	35.20	34.77	103
Feb.						
1	35.25	35.45	34.80	34.20	33.90	189
2	35.50	35.75	35.05	34.55	34.20	101
3	35.88	36.50	35.75	35.15	34.75	177

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.35⅞
February	.35¾
March	.35⅝
Thin Latex Crepe:	
Spot	.36½
Thin Brown Crepe, No. 2	.34
Flat Bark Crepe	.30⅞

London Market

(Standard Smoked Sheets)

March	34.38 - 34.52
Apr.-June	34.23 - 34.38

Singapore Market

(Standard Smoked Sheets)

March	33.62 - 33.65

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.490 - .500
Butaprene NL	.500 - .510
Butaprene NAA	.540 - .550
Butaprene NXM	.580 - .590
Chemigum 30N4NS	.500 - .510
Chemigum 50N4NS	.500 - .510
Chemigum N3	.580 - .590
G-E Silicone Rubber (compounded)	2.50 -3.60
G-E Silicone Gum (not compounded)	4.00 -4.20
GR-I	—— - .230
GR-S	—— - .230
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types AC and CG	—— - .550
Neoprene Type GN	—— - .410
Neoprene Type GN-A	—— - .410
Neoprene Type GRT	—— - .420
Neoprene Type KNR	—— - .750
Neoprene Type S	—— - .420
Neoprene Type W	—— - .390
Neoprene Type WRT	—— - .450
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Polysar "S" Types	—— - .230
Polysar Butyl Types	—— - .230
Polysar Krynol	—— - .189
Polysar Krynol NS	—— - .194
Polysar Krynac	.500 - .510
Polysar Krynac 801	.580 - .590
Polysar SS-250-K	.300 - .310
Silastic (compounded)	1.95 - .338
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— -1.000

Middling Upland Quotations

	Jan. 6	February 3		
	Close	High	Low	Close
Mar.	34.56	34.67	34.61	34.61
May	34.86	34.99	34.93	34.93
July	35.00	35.20	35.13	35.13

Synthetic Rubber

The report to Congress by the Rubber Producing Facilities Disposal Commission recommending transfer of 24 of 27 government facilities for the production of synthetic rubber to private industry has met with wide approval both from the trade and the public press. H. C. Bugbee, president of the Natural Rubber Bureau, stated that the report "is welcome news to the Natural Rubber Bureau and the Southeast Asian rubber producers it represents."

Mr. Bugbee added that the natural rubber growers "look forward with confidence to the opportunity of competing freely with a synthetic rubber industry which will operate for the first time on its own feet as soon as Congress sanctions the transfer of the plants."

Competitive Market

While it was felt at one time that concentrated Congressional opposition might develop over transfer of the synthetic facilities to private industry, the trade does not now believe such will be the case. It is expected that the transfer will take place with a minimum of difficulty.

Purchasers of GR-S plants are now looking toward a period of "hot" competition for markets. At least one company is already offering non-premium grades of GR-S at a base delivered price of 25c per pound, contingent, of course, on final approval of the plant sale.

The big question that remains is the eventual price level of synthetic rubber under private ownership. It has been stated that the price relationship between natural and synthetic is a prime factor in determining whether synthetic producers can, to some extent, cut into that part of the market that now goes to the natural product.

As of the moment, synthetic and natural are just about sharing the market in the United States. The Natural Rubber Bureau has estimated that in 1954, 630,000 long tons of synthetic rubber and 600,000 long tons of natural were consumed.

Elsewhere on this page appears a report that Malayan traders are looking toward the next twelve months with great optimism. Other Malayan traders, however, see the price of synthetic putting a ceiling on the price of natural rubber within a two-year period.

Technological Developments

It has long been the opinion of many in the trade that once the synthetic facilities were sold to private industry, a great number of new technical developments would be announced. Many say, however, that no new developments have been held back. Why, they ask, if a company had some new development, would it buy a plant geared to present methods?

It may be, however, that with competitive forces at work, there is likely to be greatly increased research activity by the private companies. Government ownership has been a discouraging factor in technological research on synthetic rubber. Not only were new developments pooled so that they were available to all plant operators, but the government hasn't particularly encouraged fundamental research as such, it is said.

All things considered, the happenings of the next few months will do much to determine the future course of the rubber industry. It should be an interesting time, indeed.

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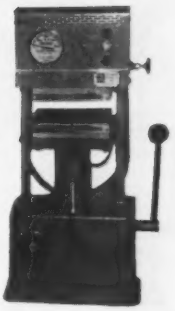

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MARKETS

NEWS-PRICES

NEW YORK, FEB. 3, 1955

Reclaimed Rubber

Reclaimers report that demand is up compared with the situation at this time in 1954. With the exception of Butyl tube reclaim, prices remain relatively unchanged. The trade states that widely fluctuating prices for Butyl tube scrap make almost impossible a firm price for Butyl tube reclaim.

The trade recalls that in June, 1953, Butyl tube scrap was selling for about 2¼c per pound. By June of 1954, Butyl tube scrap was selling for about 2½c a pound. By January of 1955, scrap prices were approaching the 7c level and, at this writing, reclaimers report prices being in the range of 9 to 9½c per pound.

The rapid rise in prices is attributed, in large measure, to present production of tubeless tires. Whether this situation will hold is problematical, considering a reported swing away from the use of Butyl in tubeless tires by some tire manufacturers.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14¼
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

The trade reports that the scrap rubber market has been slightly more active during the past few weeks, with trading in tubes the main feature. Demand for Butyl tube scrap, heightened by the advent of the tubeless tire, has caused rapid upward adjustment of prices. Widely fluctuating Butyl scrap prices preclude the publication of any price figure which might even approach validity a week or even a few days hence. Prices on other types of scrap remain relatively stable, the trade reports.

While the general tenor of the market has improved to a slight degree, the cold weather experienced during the past few weeks served to inhibit activity. It has been reported that reclaimers are more inclined to work with newly-arrived scrap than to dig into outdoor stockpiles which are generally frozen or wet.

(Prices Delivered Akron)

Mixed tires	ton	13.50
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	17.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.08
Natural Rubber Black Tubes	lb.	.05¼
Butyl Rubber Tubes	lb.	

Tire Fabrics

The Textile Economics Bureau reports that in the third quarter of 1954, production of tire cord and fabric was 80,000,000 pounds, 24% under the second quarter and 39% less than in the corresponding 1953 period. The third quarter 1954 figure reflects strikes in the rubber industry during the period and hence comparisons with past quarters are not of much significance.

From a fiber standpoint, the feature of the data continues to be the growth of nylon. In the latest quarter, nylon represented 9% of the total tire cord and fabric produced. During 1953, nylon's average share of the total was slightly less than 4%.

Cotton Duck End-Uses

The Census Bureau recently released data on the end-uses of cotton duck in 1948 and 1952. The figures show that output of cotton duck in 1952 was 84% higher than in 1948, the actual increase in physical units having been 165,200,000 yards.

Tarpaulins were the largest single end use for cotton duck in 1952, representing 18% of the total compared with 17% in 1948. Awnings were the second most important item in both 1948 and 1952, accounting for 12% of the total in each year. Manufacturers of tents absorbed 10% of the cotton duck produced in 1952, compared with 7% four years earlier.

Producers of bags and sacks used 6% of the duck produced in 1952, a slight percentage increase from 1948. Another 6% of 1952 output went to manufacturers of rug-backing materials; comparable 1948 data are not available.

The clothing and shoe trades took 17,100,000 yards of duck in 1952, slightly less than in 1948, but their share of the total was only a little better than half what it was in the earlier years. Finally, manufacturers of industrial hose and belting took 5% of 1952 production of duck; comparable 1948 data are not available.

Military End-Uses

While no precise data are available on the actual amounts of cotton duck which went into military end-uses, the Census Bureau notes that those companies which were able to report military and civilian production separately indicated that about 40% of their 1952 production was for military uses.

In this connection, it should be recalled that in 1952 military demand for duck as a result of the Korean war was still large. Since then, demand has been greatly reduced, as reflected in the much lower rate of duck production in 1953 and the first half of 1954, the Census Bureau states.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.74
9.25 oz. (per square yard	lb.	.69½
11.65 oz. (per square yard)	lb.	.66
8.9 oz. (per square yard)	lb.	.71

Liquid Latex

Natural: London reports that its market has been quiet and featureless and trading has been on a modest scale. Prices have fluctuated in line with movements in the ribbed smoked sheet market. The uncertainty attaching to prices is inducing English and Continental customers to hold back and wait for some signs of stability before committing themselves to purchases beyond immediate needs.

Production and consumption of latex appears to be fairly well in balance and it is not unlikely that the seasonal decrease in production may coincide with a good consumer demand for the Spring and Summer trade and create, during the second quarter of the year, a situation which may bring prices to a more realistic level. Current prices for U. S. bulk latices are in the range of 35½ to 40c.

Synthetic: Total figures for 1954 should show that synthetic rubber latices have reached new highs in both production and consumption. When tabulations are complete, total production for 1954 will approximate 68,000 long tons. GR-S latices are lowest in price and account for about 75% of production. Consumption of synthetic latices closely approaches production, since stock positions were established years ago and vary only slightly from period to period because of the need for special tank storage.

The trade expects that during the coming months and with the sale of the synthetic rubber facilities to private interests, prices for GR-S latices may be increased by 2 to 8c per pound.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of 25 points since our last report (January 6), high for the period being 35.20c reached on January 26, 28 and again on January 31, and low being 34.95c reached on January 14, 17 and 18. The average price of middling uplands for the month of January was 35.07c based on 21 trading days. This compares with an average of 35.03 in December, 1954.

The Department of Agriculture advises that world production of cotton in the 1954-55 season is now estimated at 36,200,000 bales of 500 pounds gross weight each. This represents an increase of 1,500,000 over earlier estimates, but 1,800,000 bales less than last year's estimate of 38,000,000 bales.

It has been reported that the House Agriculture Committee will soon hold hearings on legislation to restore mandatory 90% parity price supports on cotton and other basic farm products. The Senate Agriculture Committee is expected to investigate charges that the State Department has hampered the disposal abroad of surplus cotton and other farm surpluses.

Last year, Congress passed legislation authorizing the government to sell or barter $700,000,000 worth of surplus commodities to foreign nations and to give away another $300,000,000 worth. Since the legislation was passed, however, there have been complaints that the State Department, fearful of upsetting the normal trade of other nations, has consulted with foreign nations in advance to see whether they would object to the proposed sale of surplus commodities.

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CURRENT MARKET PRICES

of rubber chemicals and compounding ingredients

FEBRUARY 3, 1955

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l, less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*For Export Only

The arrangement of this section closely follows the Chemical Section of the 1953-54 RUBBER RED BOOK. Readers are referred to the RUBBER RED BOOK for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)	lb.	.50	.57
A-32	lb.	.66	.80
A-100	lb.	.52	.66
Accelerator No. 8	lb.	—	1.10
Accelerator—49	lb.	.53	.54
Accelerator—552	lb.	—	2.25
Accelerator—808	lb.	.66	.68
Accelerator—833	lb.	1.17	1.19
Accelerator B	lb.	—	.89
Altax	lb.	.48	.50
Ancap *	lb.	.38	.40
Ancatax *	lb.	.48	.50
Ancazate * BU (ET & ME)	lb.	—	1.04
Ancazide * ET	lb.	—	1.04
ME	lb.	—	1.14
Beutene	lb.	.66	.68
Bismate, Rodform	lb.	—	3.00
Butasan	lb.	—	1.04
Butazate	lb.	—	1.04
Butyl Accelerator 21	lb.	—	.89
Butyl Eight	lb.	1.10	1.35
Arazate	lb.	—	2.25
Captax	lb.	.38	.40
C-P-B	lb.	—	1.95
Cumate, Rodform	lb.	—	1.45
Dibenzo G-M-F	lb.	—	2.60
Diorthotolylguanidine	lb.	.57	.58
Diphenylguanidine	lb.	.48	.55
El-Sixty	lb.	.50	.57
Ethasan	lb.	—	1.04
Ethazate	lb.	—	1.04
Ethyl Thiurad	lb.	—	1.04
Ethyl Tuex	lb.	—	1.04
Ethylac	lb.	.93	.95
G-M-F	lb.	—	2.60
Guantal	lb.	.57	.64
Harvex	lb.	.62	.68
Hepteen	lb.	.44	.46
Base	lb.	—	1.85
Kure-Blend MT	lb.	—	.70
Ledate, Rodform	lb.	—	1.04
MBT-XXX	lb.	.49	.51
Merac	gal.	.75	1.05
Mercaptobenzothiazole	lb.	.38	.40
Mercaptobenzothiazyl Disulfide	lb.	.48	.50
Mertax	lb.	.49	.56
Methasan	lb.	—	1.04
Methazate	lb.	—	1.04
Monex	lb.	—	1.14
Mono Thiurad	lb.	—	1.14
Morfex	lb.	.65	.67
2-MT	lb.	—	1.00
NA-22 (for neoprene)	lb.	—	1.50
NOBS No. 1	lb.	.69	.71
Special	lb.	.74	.76
O-X-A-F	lb.	.49	.51
Pentex	lb.	—	1.04
Flour	lb.	—	.21
Permalux (for neoprene)	lb.	—	2.17
Phenex	lb.	.52	.57
Pip-Pip	lb.	—	2.25
Polyac	lb.	—	1.65
R-2 Crystals	lb.	—	4.35
Rotax	lb.	.49	.51
RZ-50-A	lb.	—	1.00
B	lb.	—	1.00
SA 52	lb.	—	1.14
SA 57	lb.	—	1.04
SA 62	lb.	—	1.04
SA 66	lb.	—	2.75
SA 67	lb.	—	1.04
SA 77	lb.	—	1.04
Santocure	lb.	.69	.76
Selenac (Ethyl, Methyl)	lb.	—	2.75
Setsit-5	lb.	.75	1.05
9	lb.	.85	1.15
SPDX-GH	lb.	.69	.71
GL	lb.	1.20	1.30
Tellurac	lb.	—	1.45
Tepidone	lb.	.45	.48
Tetrone A	lb.	—	1.91
Thiofide	lb.	.48	.55
S	lb.	.50	.57
Thionex	lb.	—	1.14
Thiotax	lb.	.38	.45
Thiurad	lb.	—	1.14
Thiuram E	lb.	—	1.04
M	lb.	—	1.14
Trimene	lb.	.56	.58
Base	lb.	1.03	1.06
Tuads, Ethyl	lb.	—	1.04
Tuads, Methyl	lb.	—	1.14
Tuex	lb.	—	1.14
Ultex	lb.	1.00	1.10
Unads	lb.	—	1.14
Vulcacure NB	lb.	—	.45
ZB	lb.	—	.85
ZE	lb.	—	.85
ZM	lb.	—	.85
Z-B-X	lb.	—	2.45
Zenite	lb.	.48	.50
A	lb.	.57	.59
Zenite Special	lb.	.49	.51
Zetax (uncoated)	lb.	.49	.51
Zimate, Butyl	lb.	—	1.04
Zimate, Ethyl	lb.	—	1.04
Zimate, Methyl	lb.	—	1.04

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.15¾	.16¾
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S (dlvd.)	lb.	.12½	.14¼
DAR-HY (dlvd.)	lb.	.13¾	.15½
Hydrofol Acids (dlvd.)	lb.	.12½	.18
Hyfac 430 (dlvd.)	lb.	.16¼	.18
Neo-Fat H.F.O. (dlvd.)	lb.	.14½	.15¾
Neutrax (dlvd.)	lb.	.15	.16¾
Stearex Beads (dlvd.)	lb.	.09¾	.10¾
Talene (dlvd.)	lb.	.13¾	.15½
Lime, Hydrated			
Arrowhead	ton	—	20.50
Marblehead	ton	—	16.50
Sierra	ton	—	22.00
Litharge			
Eagle-Picher	lb.	—	.17
SB (dlvd.)	lb.	—	.15
Magnesium Oxide, Heavy			
General Magnesite 500	lb.	.05	.05½
600	lb.	.06	.07
Michigan No. 15	lb.	.06	.06½
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	—	.31
Careymag	lb.	.25¼	.26
General Magnesite (Neoprene Grade)	lb.	.29¼	.30
General Magnesite No. 101	lb.	.25¼	.28
Genmag ML	lb.	.25¼	.28
195	lb.	—	.20½
K & M (Neoprene Grade)	lb.	.30	.34

ACTIVATORS (Cont'd)

Magnesium Oxide, Light (cont'd)			
Light Calcined Magnesia No. X-01	lb.	.25¼	.26
Light Carbonate of Magnesia, Technical	lb.	.10½	.12
Maglite D	lb.	.25¼	.26
M	lb.	.29¼	.30
Marine's (Neoprene Grade) (l.c.l.)	lb.	.29¼	.30
Michigan No. 30	lb.	—	.26
Neomag Powder	lb.	.29¼	.30
Pellets	lb.	.31¼	.32
No. 40 Extra Light	lb.	—	.30
Witco Extra Light	lb.	.32	.35
Oleic Acid			
Emersol 210 (dlvd.)	lb.	.17¾	.19½
L.C.P. Red Oil	lb.	.17¼	.19
Neo-Fat 92-04	lb.	.18	.19¾
94-04	lb.	.15½	.17½
Palm Oil Fatty Acid (c.l.)	lb.	.12¾	.15¾
Potassium Oleate (dms.)	lb.	.45	.55
Red Lead			
Eagle-Picher	lb.	—	.18
No. 2 RM (dlvd.)	lb.	—	.17
Sodium Laurate, 75%	lb	.64	.74
Sodium Oleate, 75%	lb.	.45	.55
Paste (dms.)	lb.	—	.20
Sodium Stearate, 75%	lb.	.45	.55
USP Grade (drums)	lb.	—	.37
Stearic Acid, Single Pressed			
Emersol 110 (dlvd.)	lb.	.14¼	.16
Groco 53	lb.	.14¼	.16
Neo-Fat 18-53	lb.	.13¾	.14¾
Standard Pearlstearic (dlvd.)	lb.	.14¼	.16
Wochem 730	lb.	.12	.13¼
Stearex B (dlvd.)	lb.	.15½	.16¼
Stearic Acid, Double Pressed			
Choice Pearlstearic (dlvd.)	lb.	.14¾	.16½
Emersol 120 (dlvd.)	lb.	.14¾	.16½
Groco 54	lb.	.14¾	.16½
Neo-Fat 18-54	lb.	.14¼	.15¾
Wochem 731	lb.	.13¾	.15½
Stearic Acid, Other			
Extra Pearlstearic (dlvd.)	lb.	.17	.18¾
Neo-Fat 18	lb.	.17½	.18½
18-58	lb.	.12	.13
18-61	lb.	.15¼	.16¼
Wochem 732	lb.	.16	.17¾
White Lead Basic Carbonate	lb.	.17½	.18½
White Lead Basic Sulfate	lb.	.15¾	.16¾
Zinc Laurate			
Laurex	lb.	.33	.34
Zinc Stearate	lb.	.37	.42
Aquazinc	lb.	.20	.35

Unclassified Activators

Actifat (dms.)	lb.	—	.18
Aktone	lb.	—	.25
Barak	lb.	—	.62
Curade	lb.	.57	.59
D-B-A	lb.	—	1.95
Dibutylamine (dlvd.)	lb.	.55	.56
MODX	tons	.32½	.34½
Ridacto (drums)	lb.	.24	.26
Snodette (dlvd.)	lb.	.18½	.20¼
Vulklor	lb.	.75	.85

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.17	.21
Aqua Ammonia (dms.)	lb.	.031	.035
M.B.M. (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	—	.20
Regular	lb.	—	.12
D.C. Antifoam A	lb.	5.45	6.65
Antifoam A Emulsion	lb.	2.05	4.00
Antifoam AF Emulsion	lb.	2.05	2.85
Defoama W-1701	lb.	—	.12½
Defoamer A-25	lb.	—	3.00
Defoamer 630	lb.	—	.12½
Deltyl Prime	lb.	.70	.80
Emcol IM	lb.	—	.60
GE Antifoam SS-24	lb.	5.80	6.90
SS-66	lb.	5.70	6.20
Kessco X-3 (dms.)	lb.	—	.35½
X-180	lb.	—	.29¾
X-181	lb.	—	.38½
Nopco 1407	lb.	.20	.20½
1497-V	lb.	.13¾	.14¼
1907-B	lb.	.18¾	.19¼
JMK	lb.	.48½	.49
Pluronic L61	lb.	.33½	.39
RS-968	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.35	.50
Tributyl Phosphate (dms.)	lb.	.52	.53

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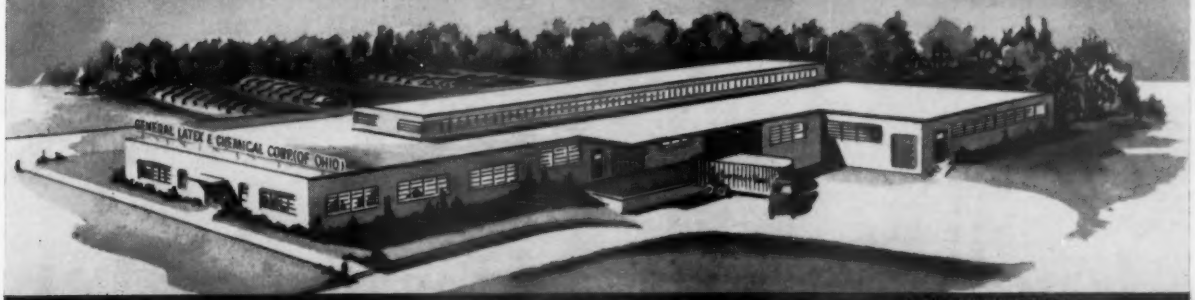

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ANTIOXIDANTS

Agebest 1293-22A	lb.	1.90	2.00
Agerite Alba	lb.	2.35	2.45
Gel	lb.	.64	.66
Hipar	lb.	.98	1.00
H. P.	lb.	.72	.74
Agerite Powder	lb.	.52	.54
Resin	lb.	.75	.77
Resin D	lb.	.52	.54
Spar	lb.	.52	.54
Stalite	lb.	.52	.54
Stalite S	lb.	.52	.54
White	lb.	1.45	1.55
Akroflex C	lb.	.77	.79
CD	lb.	.72	.74
Aminox	lb.	.52	.54
Antioxidant 2246	lb.	1.55	1.58
Antox	lb.	.52	.54
Aranox	lb.	—	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.80	.82
B-L-E	lb.	.52	.54
B-X-A	lb.	.52	.54
Deenax	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.91	.95
Eugenol C-95%	lb.	2.30	2.50
Flectol H	lb.	.52	.59
Flexamine	lb.	.72	.74
Neozone A	lb.	.56	.58
C	lb.	—	.80
D	lb.	.52	.54
Octamine	lb.	.52	.54
Oxidex	lb.	—	3.60
PDA-10	lb.	.46	.48
Permalux	lb.	—	2.17
Polygard	lb.	.52	.54
Santoflex AW	lb.	.78	.85
B	lb.	.52	.59
BX	lb.	.63	.70
35	lb.	.72	.79
Santovar-A	lb.	1.50	1.57
Santowhite Crystals	lb.	1.60	1.67
Santowhite L	lb.	.52	.59
MK	lb.	1.29	1.36
Santowhite Powder	lb.	1.60	1.67
Sequestrene AA	lb.	—	.97½
NA2	lb.	—	.79½
NA3	lb.	—	.77½
Stabilite	lb.	.55	.57
Alba	lb.	.72	.77
FLX	lb.	—	.65
L	lb.	.60	.62
White	lb.	.52	.54
White Powder	lb.	.41	.43
Stabilizer No. 1	lb.	1.55	1.80
Stabilizer No. 9-A	lb.	.80	1.05
Styphen I	lb.	.51	.55
Sunolite	lb.	.21	.23
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A	lb.	.98	1.00
V-G-B	lb.	.70	.72
Wing-Stay S	lb.	.51	.52

ANTI-SCORCHING AGENTS

Armeen HT	lb.	.31	.33
Benzoic Acid—Tech.	lb.	—	.43
Good-rite Vultrol	lb.	.62	.64
Harcopol 1183	lb.	.70	.74
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

Arquad S	lb.	.24	.26
Formaldehyde (dms.)	lb.	.052	.068
G-4 (bbls.)	lb.	1.04	1.19
G-11	lb.	2.20	2.30
Halane	lb.	.50	.60
Nuodex 100 S.S. (dlvd.)	lb.	—	1.10
Nuodex 100 W.D. (dlvd.)	lb.	—	1.25
Nuodex Zinc 8% (dms.) (dlvd.)	lb.	.24	.28
Ortho Cresol (26°-27°)	lb.	.14	.156
Retarder D	lb.	.42	.50
Soligen Drier—Copper 8% (dms.)	lb.	.20¼	.21½
Zinc 8% (dms.)	lb.	.22¼	.23½
Vancide	lb.	—	.80

ANTI-WEEBING AGENTS (for Latex)

DC 7 Compound	lb.	5.13	6.50
Webnix 34	lb.	1.50	2.25

AROMATICS (DEODORANTS)

Airkem 115	gal.	—	6.50
122	gal.	—	6.50
186	gal.	—	6.50
Alamask AA	lb.	—	3.00
AF	lb.	—	2.50
AO	lb.	—	1.50
AR	lb.	—	.50
BG	lb.	—	.15
BGM	lb.	—	.60
CY	lb.	—	2.40
DJ	lb.	—	3.35
DL	lb.	—	1.95
H	lb.	—	5.50
LD	lb.	—	.75
ND	lb.	—	2.75
O	lb.	—	6.50
OS	lb.	—	5.25

AROMATICS (Cont'd)

Bouquet 149	lb.	—	3.00
Coumarin	lb.	2.95	3.00
Curodex 19	lb.	4.75	4.90
188	lb.	5.75	5.90
198	lb.	6.75	6.90
Deodorant 65	lb.	—	1.85
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Deodorant Oil GD 3427	lb.	1.70	2.00
GD 6422	lb.	2.00	2.50
GD 6423	lb.	1.60	1.90
GD 6575	lb.	2.40	2.90
GD 31063	lb.	2.25	2.75
Latex Perfume 5	lb.	—	3.25
6	lb.	—	7.50
9	lb.	—	1.25
Naugaromes (dms.)	lb.	.60	3.00
Neutroleum Delta	lb.	—	2.60
Gamma	lb.	—	3.60
Parador A	lb.	2.00	2.50
C	lb.	2.75	3.25
E	lb.	.25	.55
GD 5280	lb.	2.00	2.50
GD 5348	lb.	1.90	3.25
Perfume Oil Bouquet Vanilla M	lb.	2.40	2.75
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
Rubbarome (dms.)	lb.	.60	3.80
Rubber Perfume 12	lb.	—	4.35
Russian Leather 7	lb.	—	4.35
Vanillin	lb.	3.00	3.25

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	—	8.00
Better Blend Soda (c.l., bags)	cwt.	—	2.40
Blowing Agent CP-975	lb.	.32	.35
Celogen	lb.	—	1.95
AZ	lb.	—	1.95
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	2.30
Sponge Paste	lb.	—	.20
Unicel	lb.	—	.90
ND	lb.	—	.76
S	lb.	—	.20
Urea	lb.	.04¼	.04¾

BONDING AGENTS

Braze	gal.	6.00	9.00
Cover Cement	gal.	2.50	4.00
Durez 12987	lb.	—	.54
Gen-Tac Latex	lb.	.75	.85½
Hylene M	lb.	3.50	3.75
M-50	lb.	1.90	2.15
Penacolite B1A	lb.	—	.95
R-2710	lb.	—	.95
Pliobond 20	gal.	2.91	4.23
30	gal.	3.65	4.97
Rex Compounds	gal.	1.30	2.85
Thixons	gal.	3.30	9.00
Ty-Ply Q (BN & S)	gal.	6.75	8.00
Tygobond 30	gal.	5.50	7.45

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Crystals	lb.	.07	.11½
Hydroxyacetic Acid—70% (dms.)	lb.	—	.084
Zinc Nitrate, Tech.	lb.	—	.22½

COLORING AGENTS

Black

Aquablak B	lb.	.09¼	.09¾
M	lb.	.08½	.09
R	lb.	.10¾	.11¼
S	lb.	.11½	.12
Black Shield 4-35 (dms.)	lb.	—	.09
Carbon Black See *Reinforcing Agents*			
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lb. bags)	lb.	.12¾	.13
Pure Black Iron Oxide	cwt.	12.75	13.00

Blue

Cooke M.B. Blue	lb.	2.45	2.85
Milori Blue	lb.	—	.48
Monastral Rubber Blue CPL	lb.	—	1.95
PCD, Dispersed	lb.	—	2.20
Peacoline Blue	lb.	—	3.85
Ramapo Blue	lb.	—	3.00
Rubber Blue GD (Disp.)	lb.	—	4.55
Rubber Blue X-1999	lb.	—	1.70
Syntheline Blue	lb.	—	3.85
Stan-Tone MBS	lb.	1.55	4.55
GPE	lb.	—	2.50
PC	lb.	—	2.40
PDS	lb.	—	2.00
PVC	lb.	—	2.50
Ultramarine	lb.	.14	.30
Vansul Blue M.B.	lb.	.90	2.60

COLORING AGENTS (Cont'd)

Brown

Brown Iron Oxide	lb.	.13¾	.14
Mapico Brown (50 lb. bags)	lb.	.13¾	.14
Stan-Tone GPE	lb.	—	3.00
Vansul Brown M.B. (Organic)	lb.	—	2.10

Green

Cooke M.B. Green	lb.	1.45	2.80
Filo Green	lb.	—	.32
Green Chromium Oxide, Pure	lb.	—	.39¾
Green Chromium Oxide, Pure Hydrated	lb.	—	1.10
Monastral Rubber Green GSD (Dispersed)	lb.	—	2.80
GSL	lb.	—	2.20
Permansa Green CP-594	lb.	—	1.35
Pigment Green B	lb.	—	1.35
GL-652D	lb.	.80	.90
Ramapo Green	lb.	—	3.50
Rubber Green FD (disp.)	lb.	—	2.05
Rubber Green X-1292	lb.	—	1.40
Stan-Tone MBS	lb.	1.55	3.35
GPE	lb.	3.00	4.50
PC	lb.	—	3.00
PDS	lb.	1.90	2.20
PVC	lb.	—	3.60
Vansul Green M.B.	lb.	1.00	2.90

Maroon

Stan-Tone MBS	lb.	—	3.50
Vansul Maroon M.B.	lb.	—	3.25

Orange

Molybdate Orange	lb.	—	.45
Rubber Orange OD (Disp.)	lb.	—	2.75
Rubber Orange X-2065	lb.	—	3.00
Stan-Tone GPE	lb.	—	1.20
PC	lb.	—	1.05
PDS	lb.	—	1.20
PVC	lb.	—	1.25
Vansul Orange M.B.	lb.	2.00	2.50

Red

Antimony Trisulfide	lb.	.72	.78
R. M. P. Sulfur Free	lb.	—	.78
R. M. P. No. 3	lb.	—	.72
Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.75	2.00
Cooke M.B. Red	lb.	1.00	3.15
Graphic Red (dlvd.)	lb.	—	.79
Indian Red, American, Pure	lb.	.12¾	.13
Doxco (English)	lb.	.11½	.11¾
Kroma Reds	lb.	.13	.15
Mapico Reds (50 lb. bags)	lb.	.12¾	.13
Oximony Iron Oxide	lb.	—	.09
Recco Red Oxide	lb.	.12	.13
Red Iron Oxide, Light	lb.	.13	.13½
Rubber Red PBD (disp.)	lb.	—	1.75
2BD, Dispersed	lb.	—	1.80
2BL	lb.	—	1.65
PBL	lb.	—	1.65
Rubanox Red CP-762 (dlvd.)	lb.	—	1.40
Rubber Red CP-339 (dlvd.)	lb.	—	1.10
Rubber Red X-1148	lb.	—	.79
Solfast Red	lb.	1.50	1.95
Stan-Tone MBS	lb.	1.20	3.53
GPE	lb.	1.65	2.00
PC	lb.	1.30	2.50
PDS	lb.	1.40	1.55
PVC	lb.	1.65	1.90
Sun Burnt Red	lb.	.11½	.11¾
Vansul Red M.B.	lb.	1.20	3.20
Watchung Red	lb.	1.63	1.95

Tan

Mapico Tan 15 (50 lb. bags)	lb.	.20¼	.20½
20 (50 lb. bags)	lb.	.20¼	.20½

White—Lithopone

Albalith	lb.	.0750	.0850
Eagle-Picher	lb.	.0750	.0825
Permolith	lb.	.0750	.0825
Sunolith	lb.	.0750	.0825

White—Titanium Pigments

Ti-Cal	lb.	.08⅜	.09⅛
R-25, R-22, R-27, R-30	lb.	.08⅜	.08⅞
R-60	lb.	.08⅜	.09⅛
Ti-Pure	lb.	.22½	.25½
Anatase grades	lb.	.22½	.23½
Rutile grades	lb.	.24½	.25½

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Rubber, Neoprene, Plastics, etc.
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Cured & Uncured
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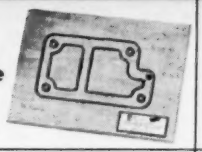
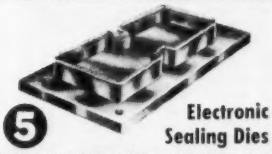
3 Mallet Handle Dies

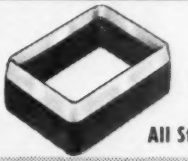


4 Steel Rule Cutting Dies

2 Steel Rule Clicker Dies



5 Electronic Sealing Dies



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Stamford, Conn.

COLORING AGENTS (Cont'd)

White—Titanium Pigments (Cont'd)

Titanox A—all grades (dlvd.)	lb.	.22½	.23½
C-50 (dlvd.)	lb.	.12⅞	.13⅜
RA (dlvd.)	lb.	.24½	.25½
RA-10 (dlvd.)	lb	.24½	.25½
RA-NC (dlvd.)	lb.	.24½	.25½
RC (dlvd.)	lb.	.08⅝	.09⅛
RC-HT (dlvd.)	lb.	.08⅜	.08⅞
Unitane O-220	lb.	.22½	.23
OR-250	lb.	.24½	.25
Zopaque	lb.	.22½	.23½
R	lb.	.24½	.25½

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 33, 44, 55, 66)	lb.	.1350	.1450
Eagle Picher AAA	lb.	.1350	.1450
Horse Head Special	lb.	.1350	.1450
XX	lb.	.1350	.1450
Protox 166	lb.	.1350	.1450
167	lb.	.1350	.1450
St. Joe Black Label	lb.	.1350	.1450
Green Label	lb.	.1350	.1450
Red Label	lb.	.1350	.1450

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	——	13

White—Zinc Oxide (French Process)

Florence Green Seal	lb.	.1525	.1625
Red Seal	lb.	.1475	.1575
White Seal	lb.	.1575	.1675
Kadox 25	lb.	.1575	.1675
Kadox 15, 17 and 72	lb.	.1350	.1450
Protox 168	lb.	.1350	.1450
169	lb.	.1350	.1450
U.S.P. (cartons)	lb.	.1675	.1775

White—Zinc Sulfide

Cryptone ZS	lb.	.2530	.2630

Yellow

Benzidine Yellow	lb.	2.00	2.25
Cadmolith Yellow (bbls.)	lb.	——	1.15
Chrome Yellow	lb.	——	.32
Cooke M.B. Yellow 405	lb.	1.90	2.00
Iron Oxide, Pure Light Shades	lb.	.11	.11¼
Dark Shades	lb.	.10½	.10¾
Mapico Yellow (50 lb. bags)	lb.	.10½	.10¾
Rubber Yellow GD (disp.)	lb.	——	2.15
GL	lb.	——	2.05
Rubber Yellow X-1940	lb.	——	2.25
Stan-Tone MBS	lb.	1.30	4.50
GPE	lb.	2.00	4.50
PC	lb.	.85	4.50
PDS	lb.	1.25	1.75
PVC	lb.	1.30	1.85
Toluidine Yellow YL-660 D	lb.	1.15	1.20
Oximony Iron Oxide	lb.	——	.06¾
Vansul Yellow M.B.	lb.	.95	1.95
Zinc Yellow	lb.	.26	.31

DISPERSING AGENTS

Anchoid*	lb.	.24	.25
Armeen 18	lb.	.38	.40
Blancol	lb.	——	.15¾
Darvan No. 1 (and No. 2)	lb.	.22	.30
Daxad 11 (21, 23)	lb.	.08	.30
Diethanalomine (dms., dlvd.)	lb.	.24½	.27½
Dispersaid	lb.	1.25	1.35
Emcol K-8300 (dms.)	lb.	.19	.20
Emulphor ON-870	lb.	——	.55
Furala	lb.	.06½	.07½
Halloid	lb.	.04½	.05½
Igepal CO-630	lb.	——	.29
Igepon T-73	lb.	——	.29½
Kyro EO (dms.)	lb.	——	.29¾
Leonil SA	lb.	——	.55
Lomar PW	lb.	——	.18
Marasperse C	lb.	.06¼	.06¾
CB	lb.	.12¼	.13¼
N	lb.	.09½	.10½
Monoethanalomine (dms., dlvd.)	lb.	.25	.27¾
Nekal BA-75	lb.	——	.40
BX-76	lb.	——	.64
Nopco 1187-X	lb.	.15	.16
Pluronic F68	lb.	.38½	.44
Rubbex	lb.	.267	.285
Stablex B	lb.	.50	.95
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	——	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¼
Trenamine D-25	lb.	.32½	.36
Triethanolamine (drums) (dlvd.)	lb.	.21½	.24¼
U-3051	lb.	——	.148
Yelkin TT	lb.	.13	.17
Zinsper	lb.	——	.15

EXTENDERS

Advagum 1098	lb.	——	.64
Arcco 1071-13B	lb.	.14½	.15½
1073-18B	lb.	.13½	.14½
1294-36B	lb.	.11½	.12½
Bunaweld Polymer No. 780	lb.	——	.22
No. 5514	lb.	——	.35
Car-Bel-Ex-A and B	lb.	——	.14
Extender 600	lb.	——	.1765
Millex	lb.	——	.07
W	lb.	——	.07
Nopco 2271	lb.	.15½	.16½
Polyco 418	lb.	.17	.18
PR-162 Latex Extender	lb.	——	.182
Synprolac	lb.	.16	.23
Synprowax	lb.	——	.23
Vistanex	lb.	——	.45

FILLERS (Inert and Reinforcing)

Abrasives Carbonite	lb.	.20	1.33
Lionite	lb.	.14½	1.25
Pumice	lb.	.03	.05
Aluminum Hydrate	lb.	.07	.10
Aluminum Silicate Aluminum Flake	ton	23.50	30.00
Marter White	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	95.50	-100.00
Barytes No. 1 Floated, White	ton	41.35	60.10
No. 2 Floated, Unbleached	ton	39.35	58.10
No. 22 Barytes (c.l.)	ton	——	25.00
No. 3805 Barytes	ton	22.00	26.75
Foam A	ton	——	41.35
Sparmite	ton	75.00	80.00
XIOR	ton	75.00	80.00
Bentonite (c.l.)	ton	——	13.50
Argosite Clay (c.l.)	ton	——	12.50
Bennett Clay (c.l.)	ton	——	32.50
SPV Volclay (c.l.)	ton	——	12.50
White Hi-Gel	ton	——	65.90
Blanc Fixe	ton	72.50	-120.00
Calcium Carbonate Atomite (c.l.)	ton	——	30.00
B.I. White No. 1 (c.l.)	ton	——	9.00
Blue Star XX	ton	——	15.50
Calcene NC	ton	72.50	92.50
TM	ton	75.00	95.00
Calwhite	ton	——	17.00
Camel-Carb	ton	——	10.00
Camel-Tex	ton	——	18.00
Camel-Wite	ton	——	30.00
Duramite	ton	——	15.00
Gamaco	ton	——	30.00
Kalite	ton	50.00	65.00
Keystone White	ton	——	16.00
Laminar	ton	——	30.00
Lesamite (c.l.)	ton	——	27.50
Lorite	ton	30.00	35.00
Millical	ton	35.00	50.00
Multifex	ton	140.00	-155.00
MM	ton	110.00	-125.00
Non-Fer-Al	ton	30.00	45.00
Purecal M	ton	56.75	80.75
SC	ton	110.00	-125.00
T	ton	110.00	-125.00
U	ton	120.00	-135.00
Rambo No. 1	ton	——	9.50
Sierracal	ton	15.00	18.50
Snowflake	ton	17.00	18.00
Super Multifex	ton	160.00	-175.00
Surfex	ton	35.00	50.00
Suspenso	ton	33.00	48.00
Witcarb Reg.	ton	56.75	80.75
P	ton	110.00	-125.00
R	ton	120.00	-135.00
RC	ton	110.00	-125.00
York White	ton	——	9.50
Calcium Silicate Silene EF	ton	120.00	-140.00
Calcium Sulfate, Anhydrous Snow White Filler	ton	——	20.50
Calcium Sulfate, Hydrous Terra Alba No. 1	ton	12.00	14.40
Chalk Whiting (l.c.l.)	lb.	.0150	.0175
Recco Paris Whiting	ton	——	33.00
OMYA Whiting	ton	——	30.00
Clay Aiken Clay	ton	——	14.00
Alsilite (c.l.)	ton	30.00	45.00
Alsite (c.l.)	ton	——	14.00
Aluminum Flake	ton	23.50	30.00
Buca (c.l.)	ton	——	45.00
Burgess No. 20	ton	——	35.00
No. 30	ton	——	37.00
Burgess Iceberg	ton	——	50.00
Catalpo (c.l.)	ton	——	35.00
Champion	ton	——	14.00
C.S.D. (c.l.)	ton	——	13.50
Crown	ton	——	14.00
Dixie (c.l.)	ton	——	14.00
Franklin Clay (c.l.)	ton	——	13.50
Harwick Clays	ton	18.50	57.00
Hi-White R	ton	——	13.50
Kaolloid Clay (c.l.)	ton	——	10.50
LGB	ton	——	17.00
LGP	ton	——	19.00
McNamee (c.l.)	ton	——	13.50
Paragon	ton	——	13.50
Pigment 5	ton	23.50	26.50
Pigment 33	ton	——	37.00
Recco (c.l.)	ton	——	14.00

FILLERS (Cont'd)

Clay (cont'd)

Swanee Clay	ton	——	12.50
Snobrite	ton	——	12.50
Suprex	ton	——	14.00
Whitetex (c.l.)	ton	——	50.00
Windsor Clay (c.l.)	ton	——	14.00
Diatomaceous Earth	ton	30.00	50.00
Kaylorite (c.l.)	ton	——	30.00
Lorite	ton	——	30.00
Flock Cotton, White	lb.	.11	.28
Colored	lb.	.11	.19
Filfloc F 40-9000	lb.	——	.13
Filfloc F 6000	lb.	——	.36
Polycel	ton	110.00	-210.00
Rayon, bleached or dyed	lb.	.80	1.25
Rayon, grey	lb.	——	.18
Rayon, pink	lb.	——	.20
Solka-Floc (l.c.l.)	lb.	.07	.16
Glue, Bone (dlvd.)	lb.	.18	.20½
Leather, Shredded	lb.	.05	.17
Lignin	lb.	.06	.08
Indulin	lb.	.06	.08
Limestone, Pulverized	ton	3.00	4.75
Asbestol Regular	ton	25.00	27.00
Asbestol Superfine	ton	30.00	32.00
Georgia Marble No. 10.	ton	——	10.00
Industrial Filler No. 100	ton	——	5.75
Micro Velva A	ton	49.00	51.00
Micro Velva L	ton	57.00	59.00
No. 1 White	ton	——	10.00
Magnesium Carbonate	lb.	.10½	.13
K & M Clearcarb	lb.	——	.14
Technical (c.l., eqld.)	lb.	.1050	.1200
Magnesium Oxide Magnesite	lb.	.05	.05½
Magnesium Silicate (see Talc)			
Mica	lb.	.01¾	.07¾
Concord	lb.	.07½	.08¼
Micro-Mica	lb.	.07½	.08¼
Mineralite (c.l.)	ton	40.00	85.00
Silversheen	lb.	.07½	.08¼
Triple A Mica (c.l.)	ton	——	25.00
Vermiculite	lb.	——	.11
Wet Ground Biotite Mica	lb.	.06	.06¾
Wet Ground Mica No. 160	lb.	.07½	.08¼
Pyrophyllite No. 261	ton	——	11.50
Pyrax A (c.l.)	ton	——	13.50
WA (c.l.)	ton	——	16.00
Sawdust, Graded	ton	14.00	35.00
Silica	ton	16.00	27.00
Blue Star	ton	——	20.60
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Lo-Micron Slate Flour	lb.	——	.04½
No. 133 Slate Flour	ton	——	4.55
Sodium Silico Aluminate Zeolex 23	ton	120.00	-140.00
Talc (Magnesium Silicate) Asbestol Regular	ton	——	25.00
Blue Star	ton	——	23.00
Eastern RC-500	ton	——	30.00
No. 41	ton	——	17.70
No. 549	ton	——	63.00
French	ton	——	59.00
L. S. Silver	ton	29.25	34.25
No. 367	ton	——	13.00
No. 1600	ton	——	70.60
No. 1768	ton	——	13.00
Nytal 200	ton	——	25.00
300	ton	——	36.00
Sierra White	ton	25.75	30.75
Soapstone	ton	——	13.00
Walnut Shell Flour	ton	55.00	-100.00
Stan-Shell	ton	80.00	-100.00
Whiting, Commercial	ton	——	7.00
Camel-Carb	ton	——	10.00
C-C-O White	ton	——	19.00
Georgia Marble No. 15	ton	——	15.00
No. 16	ton	——	16.00
Keystone (c.l.)	ton	——	16.00
Piqua No. 1 YAA (c.l.)	ton	——	9.00
No. 2 LS (c.l.)	ton	——	9.00
Snowflake (c.l.)	ton	17.00	18.00
Stan-White 325	ton	8.50	11.16
Veroc (c.l.)	ton	——	9.50
Welco (c.l.)	ton	——	8.50
York White R (c.l.)	ton	——	9.00
Wood Flour	ton	25.50	48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	2.10	2.35
Black Out	gal.	4.50	8.00
Shellac, Orange Gum	lb.	.50	.60
VanWax	gal.	1.45	1.50

FLAME RETARDANTS

Celluflex CEF (dms.)	lb.	——	.65
Chlorowax 70	lb.	.18	.19
Halowax	lb.	.35½	.61½
Zinc Borate 3167	lb.	.1920	.2020
Zyrox	lb.	.76½	.86½

LATEX MODIFIERS

OPD-101	lb.	——	.26

NATURAL LATEX

Centrifuge

Cream

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- **ph - 5.1**
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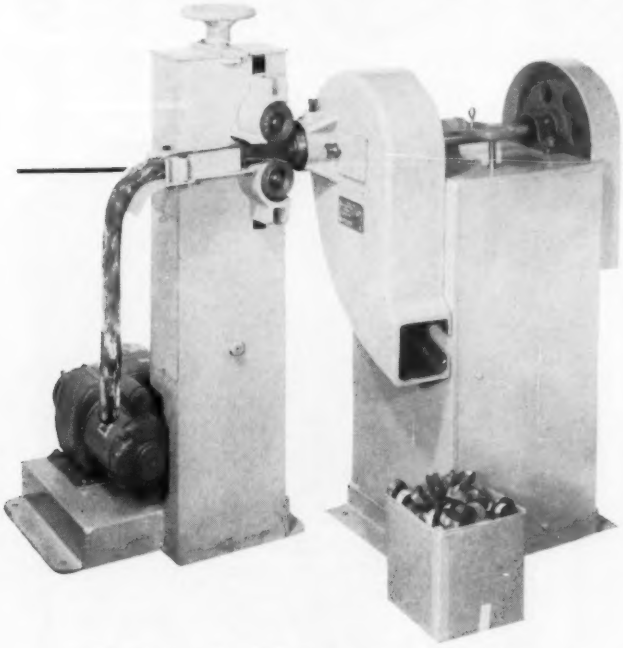

Slug Cutter with variable speed power feed attachment

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RUBBER SLUG CUTTER

This cutter provides a complete range of cutting speed to deliver from 100 to 1800 slugs per minute of extruded stock, ¼" to 3" in diameter. A spring loaded work stop, strong and easily adjustable, gives precise control of slugs in length from ⅛" to 4". Connected directly to the tuber, this versatile unit keeps production high, costs low. Write for specification data sheet.

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Machinery for the Rubber Industry

LUBRICANTS, MOLD

Akro Gel	lb.	—	.165
Alipal CO-433	lb.	—	.20
CO-436	lb.	—	.26
Aquadag	lb.	3.50	4.00
Aquarex D	lb.	—	.78
L	lb.	—	.94
ME	lb.	—	.94
MDL	lb.	—	.33
WAQ	lb.	—	.23
Armid O	lb.	.39	.41
Borax, Granular (l.c.l.)	ton	89.00	94.00
Carbowax 4000	lb.	.31	.32
CD Mold Release A	gal.	—	7.00
B	gal.	—	5.00
Colite Concentrate (dms.)	gal.	—	.90
Concentrex	lb.	—	.25
Dag Dispersions No. 197	lb.	1.85	2.90
D.C. 7 Compound	lb.	5.13	6.50
D.C. Emulsion No. 7	lb.	1.59	2.07
No. 8	lb.	1.36	1.80
No. 35	lb.	1.36	2.50
No. 35A	lb.	1.36	2.50
No. 35B	lb.	1.36	2.50
No. 36	lb.	1.36	2.50
D.C. Mold Release Fluid	lb.	3.39	4.75
Dri-Lube	lb.	—	.22
GE Silicone Fluid SF-92	lb.	3.39	5.00
GE Silicone Emulsion			
SM-33	lb.	1.36	1.55
SM-61	lb.	1.36	1.55
Glydag G	lb.	1.30	2.45
Hawkeye Flake (dlvd.)	lb.	.13¾	.14¾
HSC No. 35	lb.	1.36	1.48
Igepal CO-430	lb.	—	.29
CO-530	lb.	—	.29
CO-630	lb.	—	.29
Igepon AP-78	lb.	—	.48
T-51	lb.	—	.13½
Kokobace R	lb.	.18	.18½
Linde Silicone L-45	lb.	3.72	4.80
LE-45	lb.	1.46	2.50
Lubri-Flo	gal.	10.00	12.00
Migralube	lb.	—	.35
Mold Lubricant No. 72			
Conc. (dms.)	gal.	—	1.90
No. 735 (dms.)	gal.	—	1.25
No. 769 (dms.)	gal.	—	1.20
No. 880 (dms.)	gal.	—	1.12
No. 856 (dms.)	gal.	—	1.90
No. 935 (dms.)	gal.	—	1.64
No. 980 (dms.)	gal.	—	1.60
Moldeze No. 3	gal.	5.00	6.00
Mold-Brite	gal.	—	1.50
Mold-White	gal.	—	2.00
Monopole Oil MD	lb.	—	.16
Olate Flakes	lb.	.22¼	.23¼
Orvus WA Paste (dms.)	lb.	—	.23
Polyglycol 15-200	lb.	.25	.28¼
E4000	lb.	.31	.37
Prodag	lb.	.28	.42
Purity Flake (dlvd.)	lb.	.17	.18
Rubber-Flo	gal.	1.25	2.00
Rubber-Glo	gal.	—	.94
Rusco Mold Paste	lb.	—	.25
Sericite (l.c.l.)	ton	65.00	75.00
SF-92 Silicone Fluid	lb.	3.70	4.22
SM-33 Silicone Emulsion	lb.	1.50	1.68
55	lb.	1.46	2.00
61	lb.	1.46	1.68
Thermalube	lb.	—	.13¾
Ucon Lubricants	lb.	.26¾	.27¾
Ulco Mold Soap	lb.	.12	.23

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	—	.25
Emcol DS-50	lb.	—	.38
RDH-S	lb.	—	.27
Extrud-o-Lube	gal.	—	1.54
G.B. Naphthenic Neutrals	gal.	.11	.18
Ivory Chips	lb.	.18¾	.19¾
Latex-Lube GR (dlvd.)	lb.	.19¼	.20
No. 82-A (450 lb. dms.)	lb.	—	.08½
Propylene Stearate (dms.)	lb.	.68	.78

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.37	.42
Calcium Stearate	lb.	.35	.40
D.C. 4 Compound	lb.	5.13	6.50
D.C. 200 Fluid	lb.	3.39	4.75
ELA	lb.	—	.82
GE Silicone Fluid SF-92	lb.	3.39	5.00
Glycerized Lubricant	gal.	—	1.48
Glydag B	lb.	1.50	2.10
G	lb.	1.30	2.45
Hydro-Zinc	lb.	—	.20
Latex-Lube Pigmented (dlvd.)	lb.	.17¼	.18¼
R-66 (factory)	lb.	—	.16½
Liqui-Lube (dlvd.)	lb.	—	.16¼
N.F. (dlvd.)	lb.	—	.16¾
N.T. (dlvd.)	lb.	—	.16¾
Polyethylene Glycol	lb.	.22	.26
Rubber Free (Concentrate)	gal.	—	1.44
Jel	lb.	.18	.21½
Separex	lb.	—	.25
Stock-Lube	lb.	—	.19
Slab-Dip	lb.	—	.16
Wet-Zinc	lb.	—	.22¼
Zinc Stearate	lb.	.37	.42
Z.S.D. Dispersion	lb.	—	.20

MOLD CLEANERS

Actusol (dlvd.)	gal.	1.45	1.65
Alkon (dlvd.)	lb.	.16	.16½
Metso Anhydrous	cwt.	5.10	7.35
Metso 99	cwt.	4.60	6.85
Metso 200	cwt.	6.00	8.25
Metso Granular	cwt.	4.10	6.35
Orvus Extra Granules	lb.	.22½	.23½
Rubber-Sol	gal.	2.97	3.97
Sprex A.C. (dlvd.)	lb.	.17¾	.18¾

PEPTIZING AGENTS

Peptizer P-12	lb.	.95	1.25
Pepton 22 Plasticizer	lb.	.79	.82
RPA 2	lb.	—	.78
3	lb.	—	.47
3 Conc.	lb.	—	.83
5	lb.	—	.59
6	lb.	—	1.58

PLASTICIZERS & SOFTENERS

Acto 500	lb.	—	.09
Adipol BCA (dms.)	lb.	.47	.47½
2EH	lb.	.43½	.46½
10A	lb.	.43½	.46½
ODY	lb.	.48	.51
810	lb.	.43½	.46½
XX	lb.	.43½	.46½
American Pine Tar	lb.	.0438	.0712
Arneel	lb.	.27	.39
Arolene 1980 (c.l.)	lb.	—	.10
Aromatic Plasticizer 10 (and 25) (dms.)	lb.	.05	.06½
Aromatic Tar	gal.	.0573	.1973
Bardol	lb.	.02¾	.03¾
B	lb.	.06¼	.06½
Bayol D	gal.	—	.382
F	gal.	—	.52
Beeswax, Bleached	lb.	.72	.75
Yellow Refined	lb.	.62	.64
Bondogen	lb.	.55	.60
B.R.C. No. 20	lb.	.0150	.0175
B.R.H. 2	lb.	.0213	.0351
BRS 700	lb.	.02	.0285
B.R.T. 3	lb.	.0180	.0263
4	lb.	.0250	.0260
7	lb.	.03	.031
B.R.V.	lb.	.0475	.0565
Bunarex Resins	lb.	.06½	.07½
Bunatak AH	lb.	.08	.09
U	lb.	—	.17½
No. 90	lb.	—	.09
No. 210	lb.	—	.14
Burgundy Pitch	lb.	.0843	.0888
Butac	lb.	.11¾	.12¾
BxDC (dms.)	lb.	.40	.41
Butyl Carbitol Perlargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Perlargonate (dms.)	lb.	—	.68
Butyl Oleate	lb.	.23¼	.26
Butyl Palmitate	lb.	—	.26½
Butyl Stearate (dms.)	lb.	.22	.25
BWH-1	lb.	.16	.17
Cabflex DDA	lb.	.43½	.46½
DDP	lb.	.30½	.33½
Di-BA	lb.	.43¼	.46¼
Di-OA	lb.	.43½	.46½
Di-OP	lb.	.30½	.33½
Di-OZ	lb.	.48	.50¾
DOA	lb.	.43½	.46½
DOP	lb.	.30½	.33½
ODA	lb.	.43½	.46½
ODP	lb.	.30½	.33½
Cabol 100	lb.	.02	.06
Califlux 510, 550	lb.	.02½	.03¼
G.P.	lb.	.0125	.02
R-100	lb.	.04½	.05¼
TT	lb.	.0170	.0245
Candelilla Wax, Prime	lb.	.62	.64
Refined Light	lb.	.63	.65
Carbowax 4000 (dms.)	lb.	.31	.32
Cardolite 615	lb.	.33¾	.36¾
816	lb.	25¾	.28¾
Carnauba Wax, Crude	lb.	.66	.68
Refined, Technical	lb.	.69	.74
Refined, Pure	lb.	.75	.80
Yellow	lb.	1.03	1.10
Celluflex (dms.)			
112 (t.c., dlvd.)	lb.	—	.33
179-A (t.c., dlvd.)	lb.	—	.33
179-C (t.c., dlvd.)	lb.	—	.33
179-EG (t.c., dlvd.)	lb.	—	.33
DBP (t.c., dlvd.)	lb.	—	.30
DOP (t.c., dlvd.)	lb.	—	.30½
TPP (dms., eqld.)	lb.	—	.40
Ceresine Wax	lb.	.11½	.28
Chlorowax 40	lb.	.14½	.15½
CTLA Polymer	gal.	.20	.36
Cumar Resins	lb.	.06½	.17
Darex DBP	lb.	.33	.35¾
DOP	lb.	.34	.37
DIOP	lb.	.34	.37
D.B.M.	lb.	.32	.34¾
Degras, Common	lb.	—	.14
Diallyl Phthalate (dms.)	lb.	.49¾	.52¼
Dibenzyl Sebacate	lb.	.88	.89½
Dibutoxethyl Sebacate	lb.	—	.5634

PLASTICIZERS & SOFTENERS (Cont'd)

Dibutyl Phthalate	lb.	.30	.32
Dibutyl Sebacate	lb.	.66	.68½
Dicapryl Adipate	lb.	.43	.45
Dicapryl Phthalate	lb.	.29½	.33
Dicapryl Sebacate	lb.	.61	.63½
Di-Carbitol Phthalate (dms.)	lb.	.42	.42½
Dicyclohexyl Phthalate	lb.	.59	.60
Diethyl Phthalate (t.c.)	lb.	.25	.27¾
Di-2-ethylhexyl Phthalate (t.c.)	lb.	—	.30½
Dihexyl Adipate	lb.	.42	.44
Dihexyl Phthalate	lb.	.30	.33
Dihexyl Sebacate	lb.	.62	.64½
Diisobutyl Azedate	lb.	—	.47¾
Di-iso-octyl Adipate (dms.)	lb.	.43½	.46½
Di-iso-octyl Phthalate (t.c.)	lb.	.30½	.33½
Dimethyl Phthalate (t.c.)	lb.	.27½	.30¾
Dimethyl Sebacate	lb.	1.25	1.27
Dinopol 235	lb.	.33½	.36½
IDO	lb.	.30½	.33½
MOP	lb.	.32	.35
Dioctyl Phthalate (dms.)	lb.	.30½	.33½
Dioctyl Sebacate (dms.)	lb.	.61	.62½
D.I.O.P. (dms.)	lb.	.30½	.33½
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10	lb.	.06	.06¼
Dutrex 6	gal.	—	.11
15E	gal.	—	.10
Elastex 10-P	lb.	.30½	.33½
50-B	lb.	.25	.28
DCHP	lb.	.59	.60
Emulphor EL-719	lb.	—	.62
Estac	lb.	—	.16
Ethox (dms.)	lb.	.45	.45½
Flexol B-400	lb.	.27	.28
DOP	lb.	.32½	.33½
TOF	lb.	.45½	.46½
3GH	lb.	.45½	.46
3GO	lb.	.54½	.55
4GO	lb.	.34½	.35½
426	lb.	.27	.30
Flexricin P-1	lb.	—	.32
P-4	lb.	—	.31
P-6	lb.	—	.37
P-8	lb.	—	.33
Fortex (dms.)	lb.	.12½	.14½
G.B. Asphaltic Flux	gal.	.08	.14
Galex W-100	lb.	.15½	.19¾
G. B. Light Process Oil	lb.	.025	.0325
Medium Process Oil	lb.	.03½	.04¼
G. B. Naphthenic Neutrals	gal.	.11	.18
Good-Rite GP233	lb.	.44¾	.47¾
GP261	lb.	.34	.37
Harflex 500 (dms.)	lb.	.31½	.33½
Herron-H.T.	gal.	.16	.27
Herron-Plas	lb.	—	.03¾
Herron-Wax	lb.	.05¼	.06
No. 23	lb.	.08¼	.08¾
No. 24	lb.	.07¼	.07¾
HSC No. 13	lb.	.27	.30
Indonex 632½ (633½, 634½, 637½)	gal.	.11	.17
Kapsol	lb.	.32¼	.35¼
Kenflex	lb.	.18	.27
Kesscoflex 101 (dms.)	lb.	—	.39
102 (dms.)	lb.	—	.32½
103 (dms.)	lb.	—	.41½
104 (dms.)	lb.	—	.48
105 (dms.)	lb.	—	.33¼
106 (dms.)	lb.	—	.35½
108 (dms.)	lb.	—	.37
109 (dms.)	lb.	—	.36¼
KP 23 (dms.)	lb.	.29	.32
90 (dms.)	lb.	.45	.48
140 (dms.)	lb.	.48	.48½
201 (dms.)	lb.	.58¼	.59¼
220 (dms.)	lb.	.31	.34
555 (dms.)	lb.	.33¼	.33¾
Kremol 40	gal.	.36	.46
50	gal.	.39	.49
Kronisol (dms.)	lb.	.33	.35½
Kronitex AA (dms.)	lb.	.33	.36
I (dms.)	lb.	.33	.36
K-3	lb.	.33	.36
MX	lb.	.33	.36
Lanolin, Tech. Anhydrous	lb.	—	.28
Lead Oleate	lb.	—	.30½
Lindol (dms., t.c.)	lb.	.33	.36
2-Mercaptoethanol (drums)	lb.	1.25	1.50
Methox	lb.	.35¼	.37¾
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex S-71	lb.	.46½	.47½
Montan Wax, Crude	lb.	.13½	.15
Monten Wax	lb.	—	.30½
Morflex	lb.	.32	.69½
MR 2088 (dms.)	lb.	—	.19
Natac	lb.	.11¾	.12¾
Nebony Resins (dms.)	lb.	.04	.04½
Neolene 210 (t.c.)	lb.	—	.16
212 (t.c.)	lb.	—	.14
220 (t.c.)	lb.	—	.15
Nerium	lb.	—	.09
Nevillac Resins (dms.)	lb.	.31	.85
Neville Resins (dms.)	lb.	.12	.18
Nevindene Resins (dms.)	lb.	.15	.18
Nevinol (dms.)	lb.	—	.20
Nuba 1 (and 2) (dms.)	lb.	.05¾	.06¼
3X (dms.)	lb.	.07¾	.08¼
No. 480 Oil Proof Resin	lb.	—	.18
Ohopex Q10 (dms.)	lb.	.29½	.32½
R9 (dms.)	lb.	.35½	.37¾
Opalwax	lb.	.37	.38
Ortho-Nitrobiphenyl	lb.	.13	.15

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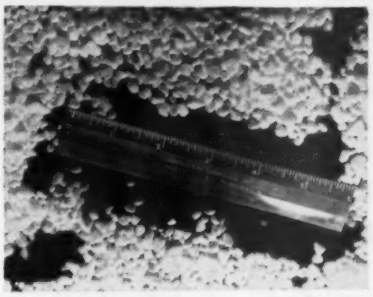

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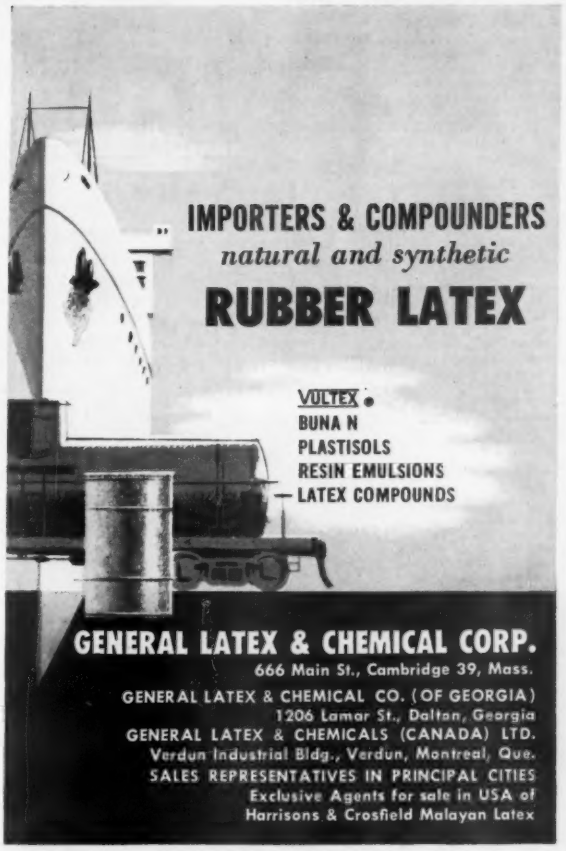

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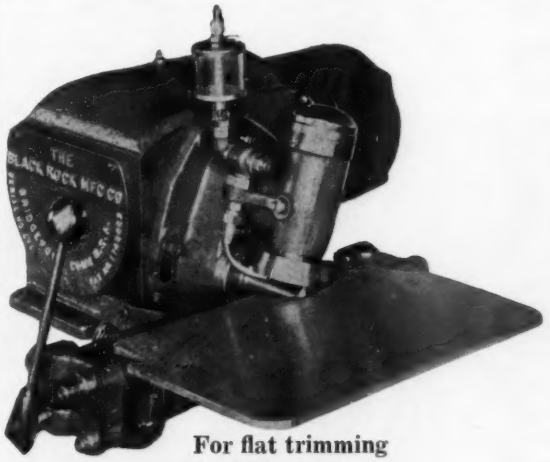

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175 Osborne Street Bridgeport 5, Conn.

N. Y. Office, 261 Broadway

PLASTICIZERS & SOFTENERS (Cont'd)

Ozokerite Wax No. 64			
White	lb.	.26	.27
Yellow	lb.	.24	.25
Palm Oil	lb.	——	.11
Paradene Resins (dms.)	lb.	.06½	.07½
Para Flux (dms.)	gal.	.1925	.2025
2016 (dms.)	gal.	.22	.23
Para Lube (t.c.l.)	lb.	.046	.048
Paraplex G-60	lb.	.35	.36
G-62	lb.	.37½	.38½
Parmo	lb.	.06	.13½
Pepton 22 Plasticizer	lb.	.79	.82
PG-16	lb.	——	.35
Philrich-5 (t.c.)	gal.	——	.11
Picco 10 (and 25)	lb.	——	.13½
60 (and 75)	lb.	——	.13
100	lb.	.13	.14
Piccocizer 30	lb.	.05½	.07
Piccolastic A (and B, C, D, E)	lb.	.28	.29
FT, FHF and FN	lb.	.1815	.1965
T-135	lb.	.22¾	.23¼
Piccolyte S Resins	lb.	.18½	.20
Piccopale Resins	lb.	.12	.13½
Piccoumaron Resins	lb.	.06½	.18
Pigmentar	lb.	.0427	.0712
Pigmentaroil	lb.	.0427	.0712
Plastac M	lb.	——	.09¼
Plasticizer 2286	lb.	——	.26¼
Plasticizer 4141	lb.	.56¾	.66¾
Plasticizer ODN	lb.	.31	.37
Plasticizer SC	lb.	.55¼	.56
Plasticizer W-3	lb.	.37	.38¾
Plastoflex 3	lb.	——	.52
50	lb.	.34¼	.35¼
55	lb.	.31	.32
55	lb.	.31¾	.32¾
520	lb.	.37½	.38½
SP-2	lb.	——	.43
VS	lb.	.41¾	.42¾
Plastogen	lb.	.07¾	.08
Plastolein 9050 (c.l.)	lb.	.53¼	.55½
9055	lb.	.29¾	.31½
9058	lb.	.49¾	.51½
9250	lb.	.36	.37¾
9715	lb.	.38¾	.40½
Plastone	lb.	.27	.30
Polycizer 162	lb.	.30½	.33½
332	lb.	.43½	.46½
ED	lb.	——	.56¾
Polyco 438	lb.	.34	.35
Polymel C-130	lb.	.19½	.20½
D	lb.	.23½	.24½
6	lb.	.05¾	.07¾
Process Oil C-255 (c.l.)	gal.	——	.22
Pronylene Stearate (dms.)	lb.	——	.32
PRR 1	gal.	.15	.35
PT 67 Light Pine Oil (dms.)	gal.	——	.60
101 Pine Tar Oil (t.c., dms.)	gal.	.0427	.0601
400 Pine Tar (600, 800) (t.c., dms.)	gal	.0427	.0601
PX-104	lb.	.32	.33
PX-108	lb.	.32½	.33½
PX-138	lb.	.32½	.33½
PX-208	lb.	.44½	.45½
PX-238	lb.	.44½	.45½
PX-404	lb.	.68½	.69
PX-438	lb.	.63½	.64
PX-917	lb.	.35	.36
Reogen	lb.	.13¼	.13½
465 Resin (dms.)	lb.	.07	.07½
Resin 731-C	cwt.	——	15.00
Resin C	lb.	.0225	.0310
Resinex	lb.	.04	.04½
L-4	lb.	.03	.04¼
Rexflex	lb.	——	.15
Rosin Oil	gal.	.54	1.20
R.S.O. Softening Oil	lb.	.03	.05
Rubberol	lb.	——	.25¾
Rubtar	gal.	——	.40
Santicizer B-16	lb.	.48¾	.49¾
E-15	lb.	.52¾	.53¾
M-17	lb.	.44¾	.45¾
No. 140	lb.	.35	.36
No. 141	lb.	.36	.37
No. 160	lb.	.27	.28
Sherolatum	lb.	.03½	.06
Softener No. 20	gal.	.09	.25
Solarite Resin No. 1	lb.	.16½	.22½
Staflex DBES	lb.	.67½	.68½
DOS	lb.	.68	.69
IXA	lb.	.34	.35
KA	lb.	.37¾	.38¾
Stanolind Petrolatum	lb.	.053	.089
Wax	lb.	.31	.33
Sunny South Burgundy Pitch	lb.	.0980	.1025
Sunny South Pine Tar	lb.	.0427	.0712
Sunny South Rosin Oil	gal.	.58	.87½
Superla Wax	lb.	.34½	.44
Syncera Wax	lb.	.23	.34
Syn Tac (c.l.)	gal.	——	.33
Synthetic Revertant Oil	lb.	——	.16
Tar, Refined	gal.	.1200	.1760
Terpene A	gal.	——	.65
TP-90B	lb.	——	.59
TP-95	lb.	——	.65
Transphalt Resins	lb.	.02¼	.04¾
Triacetin	lb.	.43	.47
Tributyl Phosphate (dms.)	lb.	.52	.53
Tricresyl Phosphate (t.c.)	lb.	.33	.35
Turgum S	lb.	.10	.11
Vanadiset B	lb.	.03½	.06
C	lb.	.03	.05¾
MR 80 Mesh	lb.	.07¼	.10

PLASTICIZERS & SOFTENERS (Cont'd)

Vistac No. 1	gal.	1.00	1.21
P	lb.	.18	.18½
Vopcolene 50	lb.	——	.37
Witcizer 100	lb.	.31	.32
200	lb.	.21	.26½
201	lb.	.23½	.29
300	lb.	.35¾	.36¾
312	lb.	.36¾	.37¾
412	lb.	.47¾	.48¾
Witresin—Granular	ton	41.00	43.00
Solid	ton	36.00	38.00

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	——	.21
Refined (dms.)	lb.	——	.18½
Castorwax	lb.	——	.24½
Dutrex 7	lb.	.12	.20
ELA	lb.	——	.82
Emcol MAS	lb.	——	.44
Kenflex N	lb.	——	.18
Millrex	lb.	——	.15
Polycin 783	lb.	——	.24½
Resin No. 510	lb.	.13½	.16½
Zyrox	lb.	.50	.79

PROTECTIVE & STABILIZING AGENTS

Acacia	lb.	.12¾	.21
Alpha Protein	lb.	.24	.28
Ammonium Alginate	lb.	——	1.02
Aroostoocrat	lb.	——	.07½
Carob Bean Flour	lb.	——	.46
Casein	lb.	.24	.31
Emcol K-8300 (dms.)	lb.	.19	.20
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	——	.19
Karaya Gum	lb.	——	.25
Locust Bean Gum	lb.	——	.31
Prosein	lb.	.0600	.0630
Rex Compound No. 2801	lb.	——	.15
Stablex B	lb.	.50	.95
K	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4		.32	.34
Armeen C	lb.	.45	.47
Mixed Crude	lb.	.17	.23
T	lb.	.29	.31
No. 517 H.B. Oil	gal.	.11½	.16½
535	gal.	.22	.27
Burco RA	lb.	.05½	.08¾
C-6 Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.25	.30
C-33 (t.c.)	gal.	——	.21½
C-42 (t.c.)	gal.	——	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	——	4.25
Liquid 50% (t.c.)	cwt.	——	2.70
Solid 76% (c.l., dms.)	cwt.	——	3.85
Cresylic Acid (99-100%)	gal.	.80	.94
D-4 (t.c.)	gal.	——	.27
E-5 (t.c.)	gal.	——	.25
Flake Calcium Chloride (77-80%)	ton	——	27.00
G. B. Reclaiming Oil	gal.	.12	.18
CD-10	gal.	.10	.16
CD-50-U	gal.	.18	.24
Gensol No. 6 (t.c.)	gal.	——	.40
Heavy Aromatic Naphtha	gal.	——	.13¼
LX-77 Reclaiming Solvent	gal.	.21	.33
LX-572 Reclaiming Oil	gal.	.27	.32
LX-777 Reclaiming Oil	gal.	.23	.33
Neo-Fat D-242	lb.	.05½	.07¾
PT 67 Light Pine Oil (dms.)	gal.	——	.60
PT101 Pine Tar Oil (t.c., dms.)	gal.	.0427	.0601
PT150 Pine Solvents (dms.)	gal.	——	.44
Q Oil (t.c.)	gal.	——	.286
Reclaiming Oil 3186-G	gal.	.25	.36½
Reclaiming Reagent No. 1431	lb.	.21	.25
R.P.A. No. 3	lb.	——	.47
RR-10	lb.	——	.36
Soda Ash (c.l., bags)	cwt.	——	1.65
Solvent 534	gal.	.20½	.26½
Solvent Oil 21	gal.	.24	.29
C-42	gal.	.23	.28
Union Solvent 4060-O	gal.	——	.184
X-1 Resinous Oil	lb.	.0210	.0300

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0740	.1225
Continental F	lb.	.0740	.1225
Croflex	lb.	.0740	.1225
Dixiedensed (and S)	lb.	.0740	.1225
HX Compact	lb.	.0740	.1225
Kosmobile (and S)	lb.	.0740	.1225
Micronex HPC	lb.	.0740	.1225
Spheron 4	lb.	.0740	.1225
Witco No. 6	lb.	.0740	.1225

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0740	.1225
Collocarb	lb.	——	.0625
Continental A	lb.	.0740	.1225
Croflex TH	lb.	.0740	.1225
Dixiedensed HM (and S-66)	lb.	.0740	.1225
Huber Arrow TX	lb.	.0740	.1225
Kosmobile HM (and S-66)	lb.	.0740	.1225
Micronex Standard	lb.	.0740	.1225
Spheron 6	lb.	.0740	.1225
Texas M	lb.	.0740	.1225
Witco No. 1	lb.	.0740	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0740	.1225
Collocarb	lb.	——	.0625
Continental AA	lb.	.0740	.1225
Croflex 77	lb.	.0740	.1225
Dixiedensed 77	lb.	.0740	.1225
Kosmobile 77	lb.	.0740	.1225
Micronex W-6	lb.	.0740	.1225
Spheron 9	lb.	.0740	.1225
Texas E	lb.	.0740	.1225
Witco No. 12	lb.	.0740	.1225
Wyex	lb.	.0740	.1225

Channel, Conductive (CC) (bags)

Continental R-40	lb.	.2300	.3000
Dixie 5 Dustless	lb.	.1200	.1900
Dixie Voltex	lb.	.2300	.3000
Kosmink Dustless	lb.	.1200	.1900
Kosmos Voltex	lb.	.2300	.3000
Spheron C	lb.	.1400	.1850
Voltex	lb.	.2300	.3000
Texas 109	lb.	.0790	.1190

Channel, Surface Treated (CST) (bags)

Texas 109	lb.	.0790	.1190

Conductive Furnace Black (CFB) (bags)

Aromex 115	lb.	.0890	.1290
Shawinigan Acetylene Black	lb.	.1700	.2600
Vulcan C	lb.	.1050	.1500

Furnace, Fast Extruding (FEF) (bags)

Arovel	lb.	.0600	.1000
Collocarb	lb.	——	.0525
Continex	lb.	.0650	.1050
Croflex 50	lb.	.0600	.1000
Dixie 50	lb.	.0600	.1000
Kosmos 50	lb.	.0600	.1000
Philblack A	lb.	.0600	.1000
Statex M	lb.	.0600	.1000
Sterling SO	lb.	.0600	.1000

Furnace, General Purpose (GPF) (bags)

Dixie 35	lb.	.0500	.0900
Kosmos 35	lb.	.0500	.0900
Sterling V	lb.	.0500	.0900
V (Non-Staining)	lb.	.0500	.0900

Furnace, High Modulus (HMF) (bags)

Collocarb	lb.	——	.0525
Continex HMF	lb.	.0550	.0950
Croflex 40	lb.	.0550	.0950
Dixie 40	lb.	.0550	.0950
Kosmos 40	lb.	.0550	.0950
Modulex	lb.	.0550	.0950
Statex 93	lb.	.0550	.0950
930	lb.	.0470	.0870
Sterling L	lb.	.0550	.0950
LL	lb.	.0550	.0950

Furnace, Semi-Reinforcing (SRF) (bags)

Collocarb	lb.	——	.0400
Continex SRF	lb.	.0450	.0850
Croflex 20	lb.	.0450	.0850
Dixie 20	lb.	.0450	.0850
Essex	lb.	.0450	.0850
Furnex	lb.	.0450	.0850
Gastex	lb.	.0500	.0900
Kosmos 20	lb.	.0450	.0850
Pelletex	lb.	.0450	.0850
NS	lb.	.0450	.0850
Shawinigan Acetylene Black	lb.	.1700	.2600
Sterling NS	lb.	.0450	.0850
Sterling R	lb.	.0500	.0900
Sterling S	lb.	.0450	.0850

Furnace, Fine (FF) (bags)

Statex B	lb.	.0650	.1050
Sterling 99	lb.	.0650	.1050

Furnace, High Abrasion (HAF) (bags)

Aromex	lb.	.0790	.1190
Collocarb	lb.	——	.0675
Continex HAF	lb.	.0790	.1250
Croflex 60	lb.	.0790	.1190
Dixie 60	lb.	.0790	.1190
Kosmos 60	lb.	.0790	.1190
Philblack O	lb.	.0790	.1190
Statex R	lb.	.0790	.1250
Vulcan 3	lb.	.0790	.1250

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REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace Super Abrasion (SAF) (bags)

Philblack E	lb.	.1250	.1650
Vulcan 9	lb.	.1240	.1680

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex 125	lb.	.1000	.1400
Dixie 70	lb.	.1000	.1450
Kosmos 70	lb.	.1000	.1450
Philblack I	lb.	.1000	.1400
Statex 125	lb.	.1000	.1450
Vulcan 6	lb.	.1000	.1450

Furnace, Super Conductive (SCF) (bags)

Vulcan SC	lb.	.1800	.2230

Thermal, Fine (FT) (bags)

P-33 (c.l.)	lb.	——	.0550
Sterling FT (c.l.)	lb.	——	.0550

Thermal, Medium (MT) (bags)

Shellblack *	lb.	——	.0250
Sterling MT (c.l.)	lb.	——	.0400
MT Non-Staining (c.l.)	lb.	——	.0500
Thermax (c.l.)	lb.	——	.0400
Thermax, Stainless (c.l.)	lb.	——	.0500

REINFORCING AGENTS—SILICA

Cab-o-sil (compressed)	lb.	.68	.71
Cab-o-sil (uncompressed)	lb.	.68	.71
D.C. Silica (pelletized)	lb.	.77	.81
Hi-Sil 101	lb.	.10	.11½
233	lb.	.09	.10½
C	lb.	.11	.12½
X303	lb.	.45	.50
Santocel	lb.	.62	.64
Valron Estersil	lb.	——	1.00

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac	lb.	——	.60
Darex Copolymer No. 3	lb.	.47	.49
X34	lb.	.42	.44
43G	lb.	.39	.41
Darex Copolymer Latex No. 3-L (and X34L)	lb.	.36½	.39
Durez 12687 (and 12707)	lb	——	.37
Durez 13355	lb.	——	.28
Good-Rite Resin 50	lb.	.39	.41
Kralac A	lb.	.43	.44
A-EP	lb.	.39	.41
Lampblack	lb.	——	.12
Marbon S and S-1	lb.	.39	.41
8000	lb.	.39	.41
Marmix	lb.	.39	.41
Pliolite Latex 150	lb.	.38	.39
Pliolite Resin-Rubber Masterbatches	lb.	.38	.56
Pliolite NR	lb.	.94	.95
Pliolite S3 and S6	lb.	.43	.44
S6B	lb.	.39	.41
Plio-Tuf G75C	lb.	.53	.54
G85C	lb.	.53	.54
Polyco 220	lb.	.18¼	.19¼
Polyfon	lb.	.08	.09

RETARDERS

Dutch Boy Normasal	lb.	——	.46
ESEN	lb.	.35	.37
Good-Rite Vultrol	lb.	.62	.64
Harcopol 1183	lb.	.70	.74
Retarder ASA	lb.	——	.57
Retarder PD	lb.	.35	.37
Retarder W	lb.	——	.45
Retardex	lb.	.47	.50

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	38.00	40.00
Black Diamond	ton	38.00	40.00
Byerlyte	ton	47.00	54.00
Hard Hydrocarbon (dms.)	ton	46.50	48.50
Herron Flake	ton	——	45.00
Pioneer	ton	35.00	46.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.29	.36
Brown	lb.	.1310	.2200
Car-Bel-Lite	lb.	.3300	.3600
Neophax	lb.	.1570	.2680
White	lb.	.1480	.2520

Miscellaneous Rubber Substitutes

G.B. Asphaltenes	lb.	.06	.06½
Gilsowax B	lb.	09	.11
Resin No. 1098 (drums)	lb.	——	62
No. 1198	lb.	.46¾	.49¾

SOLVENTS

Acetone (dlvd.)	lb.	.07½	.10½
American Dipentine	gal.	.26½	.57
American Pine Oil	gal.	.86⅝	1.04
Amsco Lactol Spirits (t.c.)	gal.	——	.19
Naphthol Spirits	gal.	——	.18
Mineral Spirits	gal.	——	.17
Rubber Solvent (t.c.)	gal.	——	.18
Solv A (t.c.)	gal.	——	.24½
Solv A-80 (t.c.)	gal.	——	.30
Solv B (t.c.)	gal.	——	.29½
Solv B-90 (t.c.)	gal.	——	.32
Solv D (t.c.)	gal.	——	.30
Solv E	gal.	——	.30
Solv F	gal.	——	.30
Solv F-80	gal.	——	.32½
Solv G	gal.	——	.42½
Special Naphtholite (t.c.)	gal.	——	.18
Special Textile Spirits	gal.	——	.19
Super Hi-Flash Naphtha	gal.	——	.45
Super Naphtholite	gal.	——	.18
Textile Spirits (t.c.)	gal.	——	.19
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	.09¼	.10¼
Benzol 90%	gal.	.36	.40
Butyl Acetate (t.c.)	lb.	.15	.16
Butyl Alcohol (t.c.)	lb.	.15	.16
Secondary (dlvd.)	lb.	.13	.15
Tertiary (dlvd.)	lb.	.14	.15
Carbon Bisulfide, Tech.	lb.	.0515	.08½
Carbon Tetrachloride	lb.	.08½	.10
Cosol 1	gal.	.37	.43
Cosol 2	gal.	.42	.48
Cyclohexane	gal.	.70	.72
85% (t.c.)	gal.	——	.36
Cyclohexanone	lb.	.25	.27
Diacetone, Pure (dlvd.)	lb.	.14	.15
Dichlorethyl Ether (dms.)	lb.	.14½	.15
Formal (dms.)	lb.	.30¾	.31¼
Dichloropentane	lb.	.04¼	.14¾
Dicom	gal.	.30	.42
Halowax Oil	lb.	.28	.41
Heptanes (t.c.)	gal.	.17	.22
Hexalin Cyclohexanol	lb.	.20	.22
Hexanes (t.c.)	gal.	.17	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.39	.59
Ether, Ref. (dlvd.)	lb.	.07	.08
Mersol	gal.	.43	.79
Mesityl Oxide (dlvd.)	lb.	.13½	.14½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.57	.63
Methyl Ethyl Ketone	lb.	.11	.14
Methyl Isobutyl Ketone (dlvd.)	lb.	.15	.16
N-5 Pentane Mix. (t.c.)	gal.	——	.13½
N-6 Hexanes (t.c.)	gal.	——	.14½
N-7 Hexanes (t.c.)	gal.	——	.13½
Penetrell	gal.	.26½	.57
Petrolene (t.c.)	gal.	——	.13125
Picolines, Alpha, Refined	lb.	.43½	.44
Mixed	lb.	——	.35
Proprietary Solvent (dms.)	gal.	.51	.72
Propyl Acetate (t.c., dlvd.)	lb.	——	.10¾
Alcohol (t.c., dlvd.)	lb.	——	.10
PT 150 Pine Solvent (dms.)	gal.	——	.44
Pyridine, Refined	lb.	——	.75
Quinoline	lb.	.50	1.35
Rubber Solvent (t.c.)	gal.	——	.16
Rubsol (t.c.)	gal.	——	.11875
Skellysolve B (Hexanes) (t.c.)	gal.	——	.158
C (Heptanes) (t.c.)	gal.	——	.151
E (Octanes) (t.c.)	gal.	——	.165
R (Solvent Naphtha)	gal.	——	.129
Solvent, Crude, Light	gal.	.19	.28
Solvesso 100 (t.c.)	gal.	.33	.37
150 (t.c.)	gal.	.33	.37
Sunny South Dipentine	gal.	.26½	.57
Sunny South Pine Oil	gal.	.86⅝	1.04
Sunray	gal.	.1140	.1600
Toluene (drums)	gal.	——	.38
Toluol (t.c.)	gal.	——	.34
Trichlorethane	lb.	.13	.13½
Triglycol Dichloride (dms.)	lb.	.63	.64
Union Thinner 1 (dms.)	gal.	——	.204
3 (dms.)	gal.	——	.204
5 (dms.)	gal.	——	.194
7 (t.c.)	gal.	——	.159
2-50-W Hi-Flash	gal.	——	.41
Xylol	gal.	.34	.38

STABILIZING AGENTS (for Vinyl Resins)

Advastab No. 21	lb.	1.00	1.08
BC-105	lb.	.75	.80
E-6-B	lb.	.80	.85
L paste	lb.	.65	.70
Barca 10	lb.	——	.80
Barium Ricinoleate (BVS)	lb.	——	.70
Barium Stearate	lb.	.37	.42
Basic Silicate White Lead	lb.	.18	.19
Bunatak Polymer No. 780	lb.	——	.04
No. 5514	lb.	——	.35
Cadmium Ricinoleate	lb.	——	2.00
Cadmium Stearate	lb.	1.40	1.44
Calcium Ricinoleate	lb.	——	.55
Calcium Stearate	lb.	.35	.40
Dutch Boy DS-207	lb.	——	.54
Plumb-O-Sil A	lb.	——	.29¾
B	lb.	——	.31¼
Tribase	lb.	——	.27½

STABILIZING AGENTS (Cont'd)

Dythal	lb.	——	.39½
Ferro 120 (dms.)	lb.	.73¼	.83¼
182 (dms.)	lb.	.74	.78
121 (dms.)	lb.	.68	.78
200 (dms.)	lb.	1.33	1.43
203 (dms.)	lb.	.94	.98
211 (dms.)	lb.	.65	.75
221 (dms.)	lb.	1.51	1.61
541 (dms.)	lb.	.35½	.39½
541A (dms.)	lb.	.81¾	.85¾
620 (dms.)	lb.	——	.77½
700 (dms.)	lb.	.48¾	.58¾
900 (dms.)	lb.	.90	.94
903 (dms.)	lb.	.65	.69
909 (dms.)	lb.	1.02¾	1.12¾
920	lb.	——	.98
931 (dms.)	lb.	.75¾	.85¾
1203 (dms.)	lb.	1.30	1.34
1206 (dms.)	lb.	1.23	1.27
1820 (dms.)	lb.	.90	.94
Harshaw 1-V-1	lb.	.68	.73
1-V-3	lb.	——	.43
1-V-4	lb.	——	.70
1-V-6	lb.	.50	.55
2-V-4	lb.	.90	.95
2-V-7	lb.	1.14	1.19
2-V-8	lb.	——	1.30
5-V-1	lb.	——	.41
5-V-2	lb.	——	.44
7-V-1	lb.	.90	.95
7-V-2	lb.	.95	1.00
7-V-4	lb.	1.18	1.23
8-V-1	lb.	1.14	1.19
8-V-3	lb.	.52	.57
8-V-5	lb.	.84	.89
9-V-1	lb.	.80	.85
12-V-5	lb.	——	.75
24-V-1	lb.	1.40	1.45
28-V-2	lb.	——	1.34
59-V-4	lb.	.90	.95
128-V-5	lb.	——	.86
228-V-1	lb.	——	1.54
Lead Stearate, Precip.	lb.	.39	.42
Fused	lb.	.32	.37
Lithium Stearate	lb.	.62	.67
Modicol N	lb.	.42	.42½
S	lb.	.30⅞	.31⅜
Sodium Silicates	cwt.	1.00	5.25
Stabelan E	lb.	1.35	1.50
XL	lb.	.55	.65
HR-50	lb.	.75	.90
HR Liquid	lb.	.65	.75
HR Paste	lb.	.85	.95
HR Powder	lb.	.95	1.05
Stabilizer No. 3	lb.	1.90	2.00
Stabilizer No. 42	lb.	.83	.93
Stabilizer No. 52	lb.	1.90	2.00
Stabilizer No. 89X	lb.	.75	.80
Stabilizer No. 143	lb.	.80	.90
Stabilizer BC-12	lb.	.87	.95
Stabilizer B-5	lb.	——	.70
Sodium Silicates	cwt.	1.00	5.25
Stabilizer CH-14	lb.	——	.65
Stabilizer CH-20	lb.	——	.65
Stabilizer E6B	lb.	——	.95
Stabilizer E-49	lb.	——	.60
Stabilizer E-98	lb.	——	.55
Stabilizer G-1	lb.	1.25	1.40
Stabilizer HR	lb.	.85	.89
Stabilizer JCX	lb.	——	.63
Stabilizer L	lb.	——	.60
Stabilizer OM-10	lb.	——	1.95
Stabilizer OM18	lb.	——	3.25
Stabilizer SN	lb.	——	.48
Stabilizer V-1-N	lb.	——	.43
Stabilizer VL-J	lb.	——	1.00
Staflex OY	lb.	——	1.20
QXMA	lb.	——	.70
Stayrite 10	lb.	.32	.37
P-10	lb.	.39	.44
15	lb.	.53	.57
20	lb.	.37	.42
22	lb.	1.40	1.44
Stayrite 25	lb.	.35	.40
70	lb.	——	.70
80	lb.	——	.70
90	lb.	——	.70
Vanstay L	lb.	.33	.35
H.T.	lb.	.90	.92
S	lb.	.65	.70

STIFFENING AGENTS

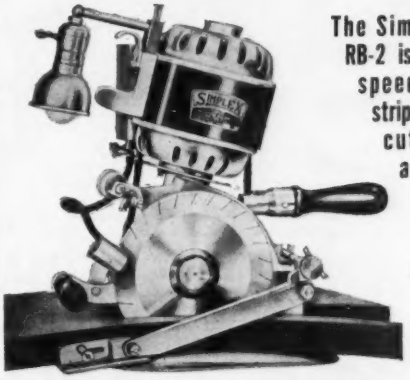
Calco S.A.	lb.	.85	.88

SUN CHECKING AGENTS

Allied AA-1144	lb.	.23	.24
AA-1177	lb.	.15½	.16½
Antisol	lb.	——	.23
Antisun (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone	lb.	.26	.27
Microflake	lb.	.20	.24
NBC	lb.	——	1.55
Ross Sunproofing Waxes	lb.	——	.13½
Sonolite 100	lb.	.21	.23
127	lb.	.17	.19
Sunproof	lb.	.30	.31
713	lb.	.25	.26
Improved	lb.	.25	.26
Super	lb.	.40	.41
Jr.	lb.	.20	.21
Tonox	lb.	.52	.54

SIMPLEX
REG. TRADE MARK

CUT 2500 FEET OF STRIP PER HOUR



The Simplex Model RB-2 is a new high speed, portable strip cutter that cuts efficiently and accurately.

U. S. Patent 2,294,497

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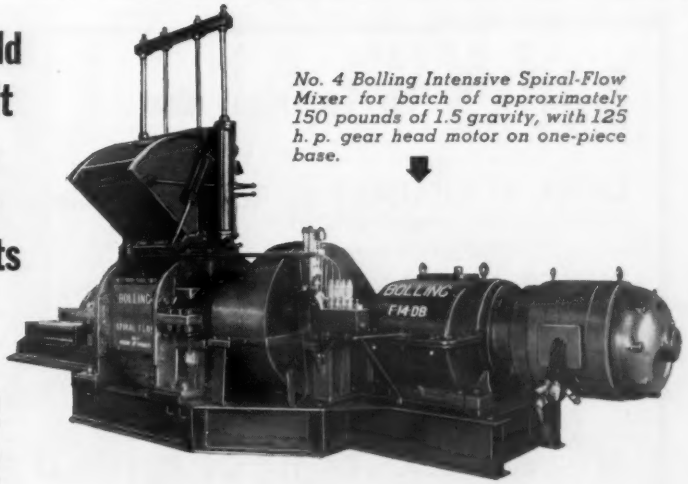

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Igepal CO-730	lb.	—	.29
CO-850	lb.	—	.29
CO-880	lb.	—	.29
Igepon CN-42	lb.	—	.25
T-77	lb.	—	.49
Kessco 50201	lb.	—	.43½
50203	lb.	—	.44
18201	lb.	—	.38
18203	lb.	—	.35¼
Pluronic L62	lb.	.33½	.39
L64	lb.	.33½	.39
Sellogen Gel	lb.	—	.12¾

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Arcco 620-32B	lb.	.20	.21
716-30	lb.	.18	.19
1041-21	lb.	.16½	.17½
Galex (drums)	lb.	.15¾	.18
Indopol H-300	gal.	1.00	1.21
Koresin	lb.	—	.95
Liquid Rubber Flux	lb.	—	.14
Nilox (c.l.)	cwt.	—	14.50
Resin V	lb.	—	.23½
Rubtack	lb.	—	.12
Synthol	lb.	—	.24¼
Tackifier 1041-21	lb.	.16½	.17½
Vistac No. 1	gal.	1.00	1.21
A	lb.	.21½	.22¼
Zirex (c.l.)	cwt.	—	14.75

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AN-10	lb.	—	.08½
Betanol (drams)	lb.	—	.70
Emulsorex No. 5	lb.	—	.35
Good-Rite K-702	lb.	.34½	.35
K-704	lb.	.21	.22
K-705	lb.	.31	.32
K-707	lb.	.18	.19
K-708	lb.	.29	.30
K-710	lb.	.15	.16
Modicol VD	lb.	.13⅞	.14⅜
VE	lb.	.13⅞	.14⅜
Polyco 296 BT	lb.	.15	.16
296-N	lb.	.15	.16
530	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.67

THICKENERS (Cont'd)

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Crystex	lb.	.19½	.23
Darex Dispersed Sulfur	lb.	.14	.16
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3	lb.	.51	.53

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OT 75% Aqueous	lb.	.63	.68
OT 100%	lb.	1.00	1.20
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Alrosperse	lb.	—	.18
Areskap 50	lb.	.30	.38
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Aresket 240	lb.	.30	.39
Dry 300	lb.	.60	.72
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Emcol 5100 (dms.)	lb.	—	.30
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Kreelon 8G (dms.)	lb.	.26	.32
Lecithin	lb.	.13	.17
Modicol N	lb.	.42	.42½
S	lb.	.30⅞	.31⅜
Orvus AB Granules	lb.	.16	.17
Parnol	lb.	.13	.18
Selapon Gel	lb.	—	.13
Santomerse D	lb.	.44	.65
S	lb.	.13	.25
Sorapon SF-73	lb.	—	.18
SF-78	lb.	—	.30
Sorbit P	lb.	—	.28
Stablex G	lb.	.50	.70
Tergitol 4 (dms., dlvd.)	lb.	.32	.33
7 (dms., dlvd.)	lb.	.43	.44
O8 (dms., dlvd.)	lb.	.31	.32
P28 (dms., dlvd.)	lb.	.18½	.19
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Vultamol	lb.	—	.17½
Wetsit Conc.	lb.	.25	.28

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D-Tac	lb.	—	.22
2-Ethyl Hexanol	lb.	.23¾	.24¾
Fura-Tone Resin 1226	lb.	.41	.43
MODX	tons	.32½	.34½
BF-13	lb.	—	.26½
Nullapon BF-13	lb.	—	.26½
BF-78	lb.	—	.61¼
Para Resin 2457	lb.	.04	.04½
2702	lb.	.04	.04½
2718	lb.	.04	.04½
Pigmented Filmite (dlvd.)	lb.	—	.16¾
Resorcin, Tech.	lb.	.77½	.78½
Rio Resin	lb.	.60	.62
Rongalite CX	lb.	—	.21½
Sherosope F	lb.	.15½	.17¾
F-455	lb.	.13½	.15¾
L	lb.	.14	.16¼
N	lb.	.15	.17¼
T	lb.	.16½	.18¾
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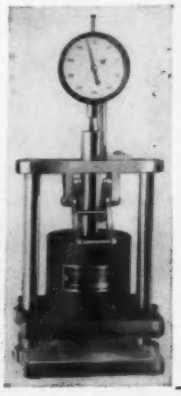

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INDEX TO ADVERTISERS

Accurate Steel Rule Die Manufacturers 783
Adamson United Co. 695
Advance Solvents & Chemical Corp. ..... —
Aetna-Standard Engineering Co. 656
Akron Equipment Co. 775
Akron Rubber Machinery Co. 798
Albert, L., & Son 798
Alco Oil & Chemical Corp. 777
American Cyanamid Co.
Intermediate & Rubber Chemicals Dept.
Insert Following 692
Pigments Div. 663
American Enka Corp. 705
American Maintenance Supply Corp. ..... —
American Resinous Chemicals Corp. ..... —
American Zinc Sales Co. ..... —
Ames, B. C., Co. ..... —
Argus Chemical Corp. 698
Atlas Electric Devices Co. ..... —

Bell Clay Co. 779
Bestread Products Co. 796
Binney & Smith Co. ..... Insert Following 742
Black Rock Manufacturing Co. 787
Bolling, Stewart, & Co., Inc. 791
Bonwit, Eric 797
Bridgwater Machine Co. 679
Brockton Cutting Die & Machine Co. 789
Brookfield Engineering Labs, Inc. ..... —
Brooklyn Color Works, Inc. ..... —
Brown Co. 660

Cabot, Godfrey L., Inc. 661, 677
Cambridge Instrument Co., Inc. ..... —
Carey, Philip, Manufacturing Co. ..... —
Carter Bell Manufacturing Co. 696
Cary Chemicals, Inc. ..... —
Chemical Publishing Co., Inc. ..... —
CLASSIFIED ADVERTISING 794-99
Cleveland Liner & Manufacturing Co.
Inside Back Cover
Clifton Hydraulic Press Co. 789, 797
Colledge, E. W., General Sales Agent, Inc. ... —
Columbia-Southern Chemical Corp. 655
Columbian Carbon Co. ..... Insert Following 742
Concord Mica Corp. 793
Consolidated Products Co. 797, 798
CONSULTANTS SECTION 796
Continental Carbon Co. 674, 675
Continental Machinery Co., Inc. ..... —
Cooke Color & Chemical Co. ..... —
Coulter, James, Machine Co. ..... —
Cumberland Engineering Co., Inc. 696

D. P. R., Inc. 775
Darlington Chemicals, Inc. 787
Davis-Standard Sales Corp. ..... —
Dayton Rubber Co. 777
Diamond Alkali Co.
Pure Calcium Prod. Div. 690
Dow Corning Corp. ..... —
Drake Personnel, Inc. 794
Du Bois Co., Inc. ..... —
du Pont de Nemours, E. I., & Co., Inc.
Rubber Chemicals Div. ..... Second Cover
Neoprene 671
Durez Plastics & Chemicals, Inc. 686

Emery Industries, Inc. 659
English Mica Co. 796
Erie Engine & Manufacturing Co. 771
Erie Foundry Co. 658

Falls Engineering & Machine Co. 667
Farrel-Birmingham Co., Inc. 664
Ferry Machine Co. ..... —
Fidelity Machine Co., Inc. 768
Flexo Supply Co., Inc. ..... —
Flightex Fabrics, Inc. 773
French Oil Mill Machinery Co. ..... —

Gammeter, W. F., Co. 798
Gelb, R., & Sons, Inc. 798
General Aniline & Film Corp. ..... —
General Latex & Chemical Corp. 781, 787
General Magnesite & Magnesia Co. 774
General Tire & Rubber Co. 673
Genseke Brothers ..... —
Gidley, Philip Tucker 796
Giffels & Vallet, Inc. 684
Glidden Co.
Chemicals-Pigments Metals Div. ..... —
Goodman, G. F., & Son 785
Goodrich, B. F., Chemical Co. 649
Goodyear Tire & Rubber Co.
Chemical Div. 652, 653
Gross, A., & Co. 767
Gummi und Asbest ..... —
Gussett Boiler & Welding, Inc. ..... —

Hale & Kullgren, Inc. 656, 796
Hall, C. P., Co. 697
Hardesty, W. C., Co., Inc. 793
Harshaw Chemical Co. 685
Harwick Standard Chemical Co. ..... Back Cover
Hercules Powder Co., Inc. ..... —
Heveatex Corp. ..... —
Hoggson & Pettis Manufacturing Co. ..... —
Holliston Mills, Inc. 789
Holmes, Stanley H., Co. 795
Howe Machinery Co., Inc. 796
Huber, J. M., Corp. 706
Humko Corp., Trendex Div. ..... —

Independent Die & Supply Co. 770
Indoil Chemical Co. ..... —
Industrial Ovens, Inc. 694
Industrial Research Laboratories ..... —
Injection Molders Supply Co. ..... —
Institution of the Rubber Industry ..... —

Johnson Corp. ..... —
Johnson Steel & Wire Co., Inc. 688, 689
Johnson Machinery Co. 797

Kautschuk und Gummi ..... —
K. B. C. Industries, Inc. 796
Kenrich Corp. ..... —
Koppers Co., Inc. 779

La Goma 793
Lambert, E. P., Co. ..... —
Lehmann, J. M., Co., William R. Thropp
& Sons Div. ..... —
Liquid Carbonic Corp. 701
Littlejohn & Co., Inc. 785

Marbon Corp. 657
Marine Magnesium Products, Division of
Merck & Co., Inc. ..... —
Maryland Cork Co., Inc. ..... —
McNeil Machine & Engineering Co. 700
Miller, F. P. & Son, Inc. ..... —
Monsanto Chemical Co.
Organic Div. ..... —
Plastics Div. ..... —
Mt. Hope Machinery Co. 793
Mt. Vernon-Woodberry Mills, Inc. ..... —
Muehlstein, H., & Co., Inc. 759

National Chemical & Plastics Co. ..... —
National Forge & Ordnance Co. ..... —
National Rosin Oil Products, Inc. 796
National Rubber Machinery Co. ..... —
National Sherardizing & Machine Co. 796
National-Standard Co. 676
Naugatuck Chemical Division
U. S. Rubber Co. 708
Neville Chemical Co. 691
New Jersey Zinc Co. ..... —

Ohio-Apex Division
Food Machinery and Chemical Corp. 766
Olin Mathieson Chemical Corp. 692
Olin, R. R., Laboratories 796
Oronite Chemical Co. 765

Pan American Chemicals 769
Parsons-Plymouth, M. W., Inc. 772
Pasadena Hydraulics, Inc. 777
Paterson Parchment Paper Co. ..... —
Pennsylvania Industrial Chemical Corp. 651
Pequanoc Rubber Co. 680, 796
Phillips Chemical Co. 650
Pittsburgh Steel Co. 688, 689
Pluess-Staufer (North American) Inc. 772
Polymel Corp. 761
Progressive Service Co. ..... —
Pure Carbonic Co. ..... —

Rand Rubber Co. ..... —
Randall, Frank E., Co., Inc. ..... —
Rare Metal Products Co. 795
Reliable Rubber & Plastic Machinery Co. 797
Revue Générale du Caoutchouc ..... —
Rhodia, Inc. 764
Richardson, Sid, Carbon Co. 800
Rotex Rubber Co., Inc. 794
Royle, John, & Sons 698
Rubber Corp. of America 791

St. Joseph Lead Co. ..... —
Scott Testers, Inc. 798
Sharples Chemicals Inc. ..... Insert Following 682
Shaw, Francis, & Co., Ltd. ..... —
Shell Oil Co., Inc. ..... —
Shiraishi Kogyo Kaisha, Ltd. 793
Siempelkamp, G., & Co. 670
Simplex Cloth Cutting Machine Co., Inc. 791
Sinclair-Collins Valve Co. 669
Skelly Oil Co. 678
Skinner Engine Co. ..... —
Snell, Foster D., Inc. 773
South Florida Test Service 796
South Texas Tire Test Fleet 781
Southeastern Clay Co. 789
Southern Clays, Inc. ..... —
Spadone Machine Co. 770
Stamford Rubber Supply Co. 783
Stanley Electric Tool Div. ..... —
Stauffer Chemical Co., Inc. 681
Stoner's Ink Co. 795
Sun Oil Co. 763

Tanney-Costello, Inc. 704
Tapper, William 670, 798
Taylor Instrument Companies 662
Taylor-Stiles & Co. ..... —
Thomaston Mills 779
Thropp, William R., & Sons, Div.
J. M. Lehmann Co. ..... —
Titanium Pigment Corp. 699
Tracerlab, Inc. ..... —
Trade News Service ..... —
Trendex Div., Humko Corp. ..... —
Turner Halsey Co. ..... —

United Carbon Co., Inc. ..... Insert Following 664
United Clay Mines Corp. 785
United Engineering & Foundry Co. ..... —
United Rubber Machinery Exchange ..... —
U. S. Rubber Co.
Naugatuck Chemical Div. 708
Universal Hydraulic Machinery Co. 797
Universal Oil Products Co. 687
Utility Manufacturing Co. 774

Vanderbilt, R. T., Co. ..... Front Cover
Velsicol Corp. 668

Wellington Sears Co. 654
Western Supplies Co. 672
White, J. J., Products Co. ..... —
Whittaker, Clark & Daniels, Inc. 779, 783
Williams, C. K., & Co., Inc. 704
Witco Chemical Co. 674, 675
Woloch, George, Co., Inc. 795
Wood, R. D. Co. ..... —
Wyandotte Chemicals Corp. ..... —

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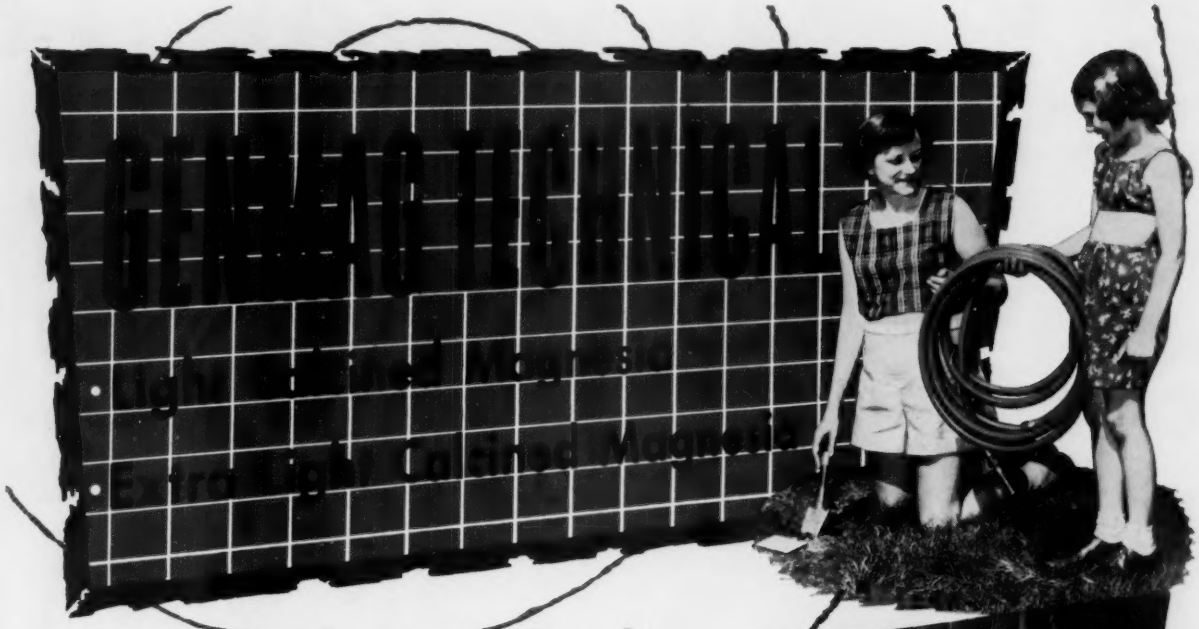

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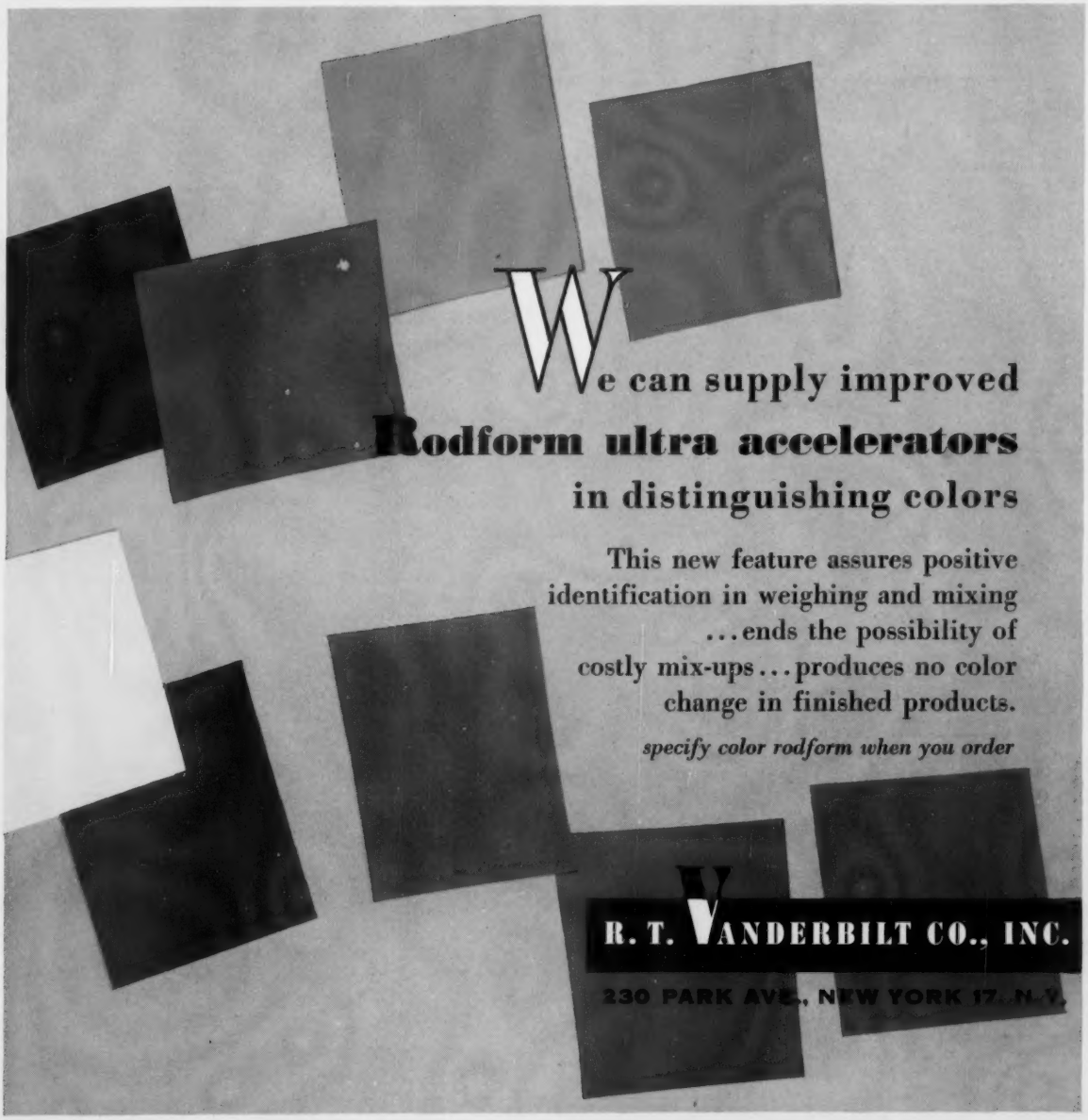
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